

TERRY KEPNER'S

portable 100

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A MONTHLY PUBLICATION (COMBINED JULY/AUGUST ISSUE)

TO: Port100>FAX 603-924-9607

// R. CAMERON, DMD // UPPER DARBY, PA // CIS#72246,2557:Easyplex or M100SIG //

July 19, 1989

*The mild mannered Tandy ducks into
a phone booth and becomes ...*

Mike Nugent, Technical Editor
Portable Computing International Corp.
Peterborough, NH 03458-0428

Dear Mike,
This facsimile was produced by simply pressing the PHNE key in
WriteROM/SuperROM, after placing the cursor over the file name. How does it
look?

The text should be nicely formatted with a header and footer; I checked
vertical text centering with MAP. The article I uploaded (filename PHNE.ART)
should even be of interest to PCSG, as they originally told me there was little
information on the subject, as PHNE is infrequently used. Likewise, the
Compuserve M100SIG sysop indicated no one had ever done this before.

Yours truly,

Ron

Ronald A. Cameron

SUPER FAX!

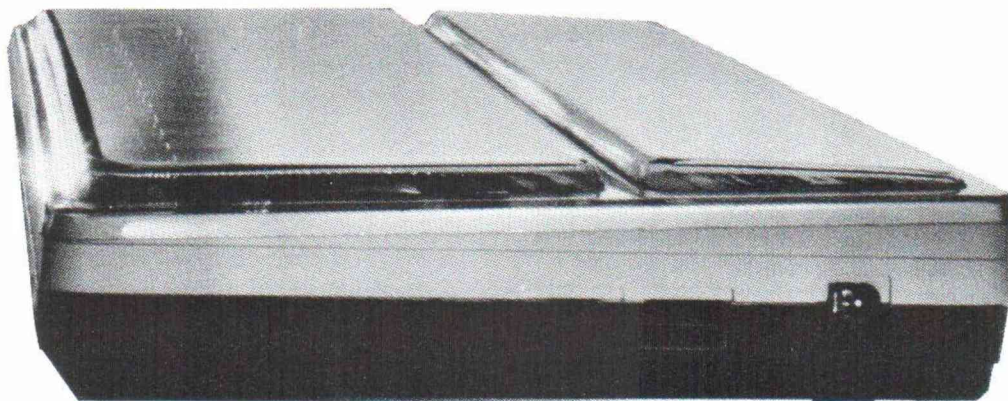
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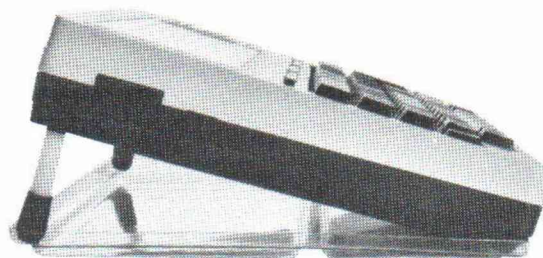
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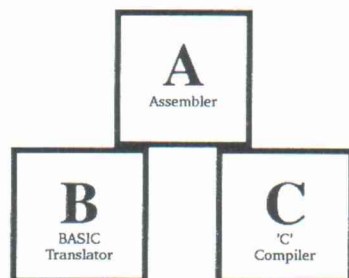
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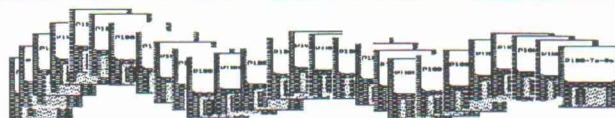
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ON
THE
COVER:

*This is a shot of a real
facsimile sent to Mike
by Ronald Cameron
via Super Rom and
CompuServe.*

TO: Port100>FAX 603-924-9587
// R. CAMERON, DND // UPPER DART, PA // C19872246,2557;EasyPlex or M100810 //
July 19, 1989

Mike Nugent, Technical Editor
Portable Computing International Corp.
Peterborough, NH 03458-0428

Dear Mike,
This facsimile was produced by simply pressing the PENE key in
WriteROM/SuperROM, after placing the cursor over the file name. How does it
look?

The text should be nicely formatted with a header and footer; I checked
vertical text centering with WAP. The article I uploaded (filename PENE.ART)
should even be of interest to PC80, as they originally told me there was little
information on the subject, as PENE is infrequently used. Likewise, the
CompuServe M100810 synopsis indicated no one had ever done this before.

Yours truly,

Ron
Ronald A. Cameron

*** Notify VIA voice line for CompuServe EasyPlex, TLX, TWX or FAX response ***

CompuServe Electronic Mail (890719191044 72246.2557 DND37-1) Page 1 of 1

SUPER FAX IT WITH SUPER ROM

by Ronald A. Cameron
*Use your Tandy portable to
send facsimiles anywhere.*

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Tandy 102

JIGSAW.BA by Joe Wasserman

A marvelous way to puzzle your brain and while away the summer evenings.

BAR+ by Mo Budlong

Optical Data Systems turns your Tandy 100/102 or 200 into a powerful workhorse.



Tandy 200

RBASIC: A MODEL 100 BASIC-TO-OPTION ROM COMPILER TRANS-IT

by Stan Wong

Save memory and protect your BASIC programs from erasure.

THE SWITCH THAT TANDY FORGOT

by N.F. Ireland

A minor modification to save your 1400LT battery.



Tandy 600



Tandy 1400LT

DEPARTMENTS

ROM WITH A VIEW I/O

THE IDEA BOX BASIC BITS FULL POWER

DEFUSR

THE CUSTOM 200

PORTABLE 100 CLASSIFIEDS

ADVERTISERS' INDEX

AARRGGHH!

What's in a name?

The portable office.

More public domain programs.

Get the most from Text, pt 2.

Great escapes.

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ROM WITH A VIEW

AARRGGHH!

(Okay, I'm calm now.) Change often seems the only constant around here. No sooner are plans in place than something happens to change them. For instance, this issue.

We had planned a special "advertiser" issue, which would ship a bit early and put our cover dates back in sync with the calendar. Well, unfortunately, Traveling Software no longer wants to support notebook computers, meaning, among other things, that they'll no longer be advertising in *Portable 100*. So much for our plans.

Thus, we've created this "Summer Issue." Our normal July/August issue just became a one-time July/August/September issue, which you'll receive in—drum roll, please—September! Your subscription has been automatically "extended" by one month, so you won't be shorted any issues.

Back on track now. No more readers upset over late issues. What's a "late" issue? Just an illusion, really. But when a cover says "May," and it's shipped in June, some folks feel they're getting "old" news. (Like, maybe *Infoworld* scooped us on cross-bank TELCOM? Get real!)

This month's *Super FAX* feature hasn't exactly been sitting around since the attack on Pearl Harbor; it just arrived and went straight into print. Now, if dating our cover December 7, 1941, would suddenly make *Super FAX* less fresh and valuable, then why not date it October 37, 2020, instead, thereby giving you the news before it happens? See what I mean?

Anyway, with the illusion restored, let's do some reality, shall we?

There's some very real creative energy flowing among our readers! Your often-brilliant "Poetic License" contest entries surprised us, entertained us, and made choosing a Tandy Portable Disk Drive 2 winner both frustrating and difficult. Who could pass up Jim Spafford's license plate question, R32KENUF? (Or for positive thinkers, says Jim, 32KRENUF.) Cy Callaghan offered F8-MENU, MAXRAM, and LAPUTER, among others. Bill Lowerre's clever use of ampersands for "and" produced T&YSGR& and T&YSD&Y. He's good with numbers, too: 04A1400. Though unrelated to the contest, he shared his all-time favorite, if mounted on a red Chevette: 04A4RE.

Bob Bittner's delightful entries came complete with explanations: DATEBUG (appropriate for old VW's), IO-IO (for cars that are snow white), K-CERA (whatever will be, will be), FIRST\$ (for athletes), O-URII ("No, I'm not."), RAMBNKR (for the memory-rich), F2BRUTE (any Latin students out there?), DNTPOKE (because it isn't nice), NOCLICK (for those with dental elastic...on their computers), WIZOFOS (for those who develop new operating systems). His LILBYTE was cute, and NULLMDM could come in handy at times.

There were so many more great plates that it seemed unfair to have only one winner. We decided to award a one-year subscription extension to Arnold Silverman and family for their group effort (and one of my favorites): CLDSTRT. Bill Lowerre's M1002GO netted him a two-year extension.

Finally, one entry from Des Moines, Iowa, expressed such bold, brazen self-confidence that we couldn't help but agree: IATPDD. Congratulations, Dick Thornton, you did!

Well, I'm off to catch a plane. Got a hot date in Tucson with Shannon (April's cover girl). See you all next month, or last year, or whatever the next cover says.

Nugent

Toolbox

Manuscripts were typed into Microsoft Word 3.0 on a Tandy 1400 LT, where they were edited, spell-checked, and had basic format instructions inserted. From there they were loaded into a Tandy 4000 (80386 CPU, Tandy EGA Monitor, Tandy LP-1000 LaserPrinter) desktop computer and placed into Aldus' IBM PageMaker 2.0a. There they were put into a rough approximation of the magazine's final appearance. Here, pull quotes are placed, headlines, intros, and bylines are sized and positioned, and advertisements positioned.

Next, the magazine was ported over to our Art Director's Macintosh II, using the 1400 LT and

Mac-link. She then went over the publication using Aldus Macintosh PageMaker 3.01, making final design decisions on photo, figure, and listing sizes and placements. She precisely placed the text and added all the little things that go into making a nice looking publication.

Page previews were output from her Laserprinter. When everyone was satisfied with the appearance, the Macintosh disk was sent to Colorite Corp. in Wisconsin for final output directly onto photographic paper. The finished magazine was then delivered to the printer, who printed it, labeled it, and mailed it to you.

portable 100

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WHAT'S IN A NAME?

I really enjoy reading your magazine every month. This is my second year now that I am renewing my subscription, but I have a few questions.

The first is why is the magazine so small? I think that a magazine should at least have 50 pages, shouldn't it? I don't mean it has to have 100 pages, but I wonder if I am getting my money's worth.

My second question that I would like you to answer is if you know of any companies or BBS that has a bulletin board with a toll-free number. I know of a few that have a 900 number, but that is not what I want. If you don't know of any, maybe someone out there knows of one.

Is there a catalog available that contains some or lots of public domain software? I don't really care about the quality of the programs, but I am looking for some that are sort of cheap.

I will again say that this is a very good magazine but you shouldn't have MS-DOS based computers in it. Do like the title says, *PORTABLE 100*.

Garry Jeppesen

What's the old saying about a "free lunch"? You always end up paying in one way or another. On the other hand, Club 100 (see the advertisements elsewhere in this issue) has quite a library of public domain stuff. They even have a catalog for you to peruse.

Our banner not only says PORTABLE 100, it also says TANDY LAPTOP COMPUTING. Would you prefer PORTABLE 100/102/200/600/1400LT/NEC8201/8300/KYOCERA/OLIVETTI? Hm. On the other hand...it sure would make cover photos a breeze...

-MN

MODEL 100 SIGN LANGUAGE?

I'm writing this letter to see if you could do an article on how helpful laptops are to students. Laptops aren't just for professional people.

In September 1987 my sign language professor gave me a M100 to use in research work. I had no experience with computers: I wasn't sure how this little notebook computer could be of any assistance to me.

After brief instructions from my professor I was using the M100 and feeling comfortable.

I just finished English 111 and would have given almost anything to have the M100 for all of the required writing.

I see how laptops can save students a lot of time and frustration.

I'm 41 years old and if I can learn to use a laptop computer anyone can.

Sue Seighman Odenton, MD

I've always felt that the Model 102 was the ideal student's computer: Small, lightweight, easy-to-use, runs on batteries (cheap ones, too), and not something you'll end up wasting hours on playing games! I would have killed to use one in high school or college (I hated English, typing, and trying to get things done by a deadline). The Model 102 makes it a positive joy to write. (My English teacher must be turning in her grave to hear that!)

If it weren't for the terrible display, the Tandy 600 is the PERFECT student's computer with its spreadsheet, word processing and text formatting, database abilities, telecommunications, and a built-in disk drive for data storage. Too bad about the display.

-TK

ONE YEAR AND COUNTING

It doesn't seem like a year since I first wrote to subscribe to your magazine. When I wrote, I was surprised to receive a hand-written note from your editor. It made me realize what a family organization you really are. I think this shows in the quality of your magazine. Although quite rough, that's a compliment.

I now own a Macintosh SE and it has taken over most of the tasks formerly performed by my M100. I no longer rely on my M100 to do everything from long math calculations to word processing to time keeping to entertaining guests with some type of game.

I have a M100, and have recently purchased a M102. I have a PDD0-1 and the Disk/Video Interface. I also use *Text Power* and adore *UltraScreen*. I still use the *FLOPPY* program that came with the PDD1, and am in the process of downloading *Power-DOS* from CompuServe. (Easier said than done.)

I am not a computer wiz. I do not want to learn any advanced programming techniques. I bought a Macintosh so I wouldn't have to learn all those special words in MS-DOS. I own a M100 because it is too simple to use.

I am a police officer in a department of 100-plus officers. I bought

my M100 to do my daily log sheet for me. I wrote a program in BASIC to access the clock and transfer my activity, along with time information into a .DO file, and then print this out, along with totals at the end of my shift. Soon I found that the M100 was also great for typing out my reports. I had one problem. Our Traffic Accident Report form is a form that has to have the blanks filled in just the right spots. We designed a program that starts out with a .DO file. The file is line after line of prompts. These prompts take up the first 16 characters of line in the file (for example, NAME >). We type in the answers behind the prompts (for example, NAME >John Doe). Then when we run the BASIC program, it extracts the first 16 characters from the line, leaving the answer. It then prints this information directly onto the form, in exactly the correct position. It also does some neat error trapping as well. I wanted to tell you about this because it's one of the nicest (and longest) programs I've ever written.

Soon after I bought my M100, several other officers caught on and bought them as well. We now have eight officers using the M100/102 in the field. These are not paid for by the department in any way. Although many departments in this state are currently using the portables, our department is officially not.

Here is my problem. I never use the D/VI because it is not compatible with the programs I use, nor is it compatible with the *FLOPPY* program. Does anyone have a disk operating systems that covers both?

About a year ago, I ordered a catalog from CompuServe entitled "The Best of Model 100" forum. Is there a newer issue of that available? How about making a couple of "The Best of P100-To-Go"?

I think you have an excellent magazine. I will continue to subscribe as long as I continue to use my M100/102. The way things look right now, that will be a long time.

Kelvin A. Helmick Chandler AZ

As yet there isn't a DOS that covers both drives. The catalog you have is the only one available, no update yet. And your suggestion about the "Best of..." sounds like it has possibilities. Is there anyone else who might be interested in such a disk?

-TK



The Portable Office

Hello again. As I write this, it is a beautiful Saturday morning. In the great State of Oregon, any day with less than an inch of rain is officially deemed beautiful. It's a law or something. I awoke to blue skies streaked with thin, high clouds that looked as menacing as Pee-wee Herman on codeine.

Even though it was a weekend morning, I had a couple of hours of work to do. A client needed a press release for a new product. Another needed an ad for the newest version of an old product. Ahhh, but the sun was out and the motorcycle was in the garage and I couldn't seem to concentrate. I wanted to go for a ride. I *wanted* to, but I didn't *have* to. Because a professional can exercise control over his emotions. He can decide what his priorities are and then execute the tasks at hand with a calm, icy detachment. Right? Right. OK. Priority #1: Put on your helmet ...

OK, so what. I never said I was a paragon of virtue. You would have done the same thing. But I wasn't completely without discipline. When I left, I took the portable office with me.

The portable office is a gray cordura bag that I bought from my local REI Co-op for around \$40. It's about 12 inches high, 6 inches front to back, and maybe 18 inches wide. There's a main compartment accessible through a large zippered hatch in the top of the bag. The front of the bag has a flat zippered pocket, the back has a flat unzipped one, and there are two large zippered pockets about 2 inches wide, one at each end. I bought some dense half-inch thick foam and cut it to fit the bottom of the three main pockets. The bag holds an amazing array of goodies—some essentials, others pure luxuries. Let's take a look:

Tandy 200: The slickest little lift-lid around. I've got mine expanded to 72K, and equipped with Traveling Software's *Sardine* ROM, a very nice word processing text formatter with a limited (7,000 word) spell checker in ROM. Model 200 Price: \$499. Expanded RAM Price: \$100. *Sardine* ROM Price: \$99.

Tandy Portable Disk Drive 2: I think of this as a one-pound life insurance policy.

When I finish work on a file, I print a copy of it, and I save it to disk. If my RAM ever goes south on me, at least I won't drop dead of a cerebral hemorrhage right on the spot. Unless I lose the disk and hardcopy. Price: \$195.

Selectronics Word Finder: I found this at Egghead Software. It has quickly gone from a luxury to an absolute essential for me. No bigger than a pocket calculator, this mini-marvel opens up to reveal a qwerty keyboard beneath a one-line LCD display. Besides being the fastest electronic dictionary I've ever used, this contains a fantastic (incredible, extraordinary, amazing, inconceivable, unbelievable, great, wonderful, excellent, fabulous, fine, good, marvelous, super, terrific, tremendous) thesaurus. Whew! I hope for your sake you're not reading this out loud. It is the perfect companion to a

sunbathing someday. Price: \$225.

Realistic Microcassette Recorder: Another great writer's tool, this is even smaller than the camera. Maybe 1 inch by 2 inches by 3 inches. It's voice activated, has cue and review, a built-in condenser microphone, and runs on two AA batteries. This is handy for those times when I need to make some quick notes, but can't use the Tandy. Like when I'm driving. Or thinking in the dark. Or eating Cheetos. Price: \$69.

Hewlett-Packard 11C Calculator: I won't elaborate—we all know what a calculator is for. But I will mention that the HP uses RPN logic, which, once you use it, forever prevents you from going back to a regular calculator. And the HP is nearly indestructible. If I were ever to crash the motorcycle with the portable office on board, I can almost guarantee the HP would be the one thing to survive. Price: \$55.

Cables: In the main compartment, I keep a smaller bag that holds a parallel printer cable; an RS-232 cable; a male-female gender changer and a null modem adapter, both for the serial cable; a modem cable; and the cable for the Portable Disk Drive. Total Price: about \$75.

Miscellaneous Items: These are all the little goodies that come in handy at one time or another. I have ink pens, marking pens, and highlighter pens. An extra microcassette. An eight-pack of AA alkaline batteries. A small ruler. Several envelopes, pre-printed return address labels, stamps, padded disk mailers, etc. A separate, zippered padded notebook folder that holds a 5x7 notepad and an appointment/address book. A very small fishing tackle box holds paperclips, rubber bands, folding miniscissors, and a AAA-powered microflashlight.

I also used to carry some Pee-Chees for papers, but after a couple of weeks in and out of the bag, they were as flimsy as a politician's promise. I found a solution at a local stationery store. They sell heavy-weight pages with pockets that fit in a typical three-ring binder. I bought several, along with a thin binder with flexible plastic covers. This setup lets me carry

Continued on page 26.

Priority #1: Put on your helmet ...

Tandy portable and is easily the best money I've spent in creating the portable office. Price: \$79.

Olympus Infinity Twin Camera: This is *tiny*! It's only about 2 inches high, 2 inches deep, and 4 inches across—but it's a full 35mm camera with some very nice features. It's an autofocus camera that, at the touch of a button, instantly flicks between a wide angle 35mm and a telephoto 70mm lens. The built-in flash can be used automatically, used for fill flash work, or turned off. There's even continuous shooting and a built-in self timer. The whole thing weighs the same as a Big Mac and takes some of the nicest pictures I've ever seen. To top it off, it's even weather-proof—perfect for the motorcycle. Carrying a camera loaded with slide film can come in handy for a writer—but mostly I just hope to come across Connie Chung

COMPATIBILITY: Tandy 100/102, 200

Super FAX It with Super ROM

Send facsimiles without a fax machine.

by Ronald A. Cameron

In these days of instant communication, the ability to send copies of documents such as contracts, waivers, or business letters instantaneously to remote areas of the world is sometimes essential. A facsimile (fax) machine was developed for this, and such machines make the job easy. But many people who need them don't have fax machines.

You can get around this if you have an unenhanced Model 100/102 or 200. You can transmit a text file (just alphanumeric characters, not a scanned image) to a fax machine using an on-line facsimile service. However, that's a process that should be reserved for a longer article because it takes a boggling number of steps.

But if you enhance your computer with PCSG's *Super ROM*, you can fax directly from the *Write ROM* word processor, simply, in about five steps. Once you have your files set up, sending professional-looking facsimiles is a breeze.

SCANNING VS. ELECTRONIC FACSIMILE ORIGINATION

How is it possible for your computer to send a facsimile manually, let alone automatically? Don't you need a special fax board in your computer? Not really—you need only a modem. Here's how it works. Type the file on your computer. You transmit the file over the phone lines to an on-line service, in this case, CompuServe. For a small charge, the service processes your file through the equivalent of a fax board, dials the remote fax

machine's number, and sends your text, converted into facsimile format. Your account is charged, at current rates, 75 cents for the first 1,000 characters.

Are there any differences between scanned and electronically-generated facsimiles? An advantage is that your computer-generated facsimile will be much clearer and sharper than one generated by scanning the original typed sheet. One disadvantage is that it's impossible to replicate the font of your letterhead or show your written signature. Remember, the on-line service is only working with an ASCII file, not a physical document.

SUPER ROM'S PHONE FUNCTION

The PHONE function makes all this possible. It lets the word processor "talk" directly to your on-line service. You enter this function from, and return on termination to, *Write ROM*'s main menu. PHONE permits setting communication parameters (*Stat*) and remembers them, independent of *TELCOM* settings. Other PHONE settings allow converting of text transmission to all capital letters, for services that require this; sending carriage returns with or without line feeds; sending documents with or without word processor formatting.

This last feature, formatting, helps in making your facsimile look like a real letter instead of just a text file dumped to the host computer, squeezed up at the top of the page. For example, you can preview the page's appearance with the *Map*

function key. You can alter preset, function-key formatting for selected portions of your text with *WordStar*-like dot commands. You can pull frequently used words, phrases, or paragraphs into the transmission from your customized "library file," wherever its "library code" appears in the text.

SENDING YOUR FIRST FAX

Initial settings. If you want to get started, type the script shown in Figure 1 into your *ADRS.DO* file. Be certain to type log-on control characters as specified in the computer's *TELCOM* documentation. Use no carriage returns in the initial line containing the standard *TELCOM* log-on sequence. You must not alter the location of carriage returns between the *Write ROM* sign-on/sign-off brackets ({}). Substitute the actual graphic characters (*GRPH*-notation) as you type.

Next, set the function-key formatting and transmission conditions from *Set* and *Phne* on the *Write ROM* main menu, as listed in Figure 2. You only need to make these settings before your very first facsimile transmission.

Text-entry format. Type your text file, beginning with the three lines in Figure 3, which must be flush left and ordered as shown. Without those lines properly typed in, the sign-off script fails. Replace the string of nines, of course, with the area code and phone number of the facsimile receiver. On the line following *SUBJECT*, enter the date. Then, insert two or three

```
FAX/M7I1E:1-999-9999<=^C?Unnnnn,nnnn^M?Ppassword^M?t^Pgo easy^M?x^Pset mode com^M?Eup^M?rca^M?)n^M===>:
{}
[GRPH-I GRPH-p sen
GRPH-p y
GRPH-p off
]
```

Figure 1. The first step in sending faxes through CompuServe. Customize this *ADRS.DO* entry with your own phone number, CompuServe ID number (shown here as n's) and password. Do not use a carriage return until just before the first brace ({}). Spaces in the sign-off script (the last four lines) are for clarity only; do not include them when typing this in.

From Set:
Left 0
Rt 79
Top 1
Botm 1
L/P 56
PL/P 56

From Phne:
Stat MDM:711E
Caps off
CRLF off
Fmtd on

Figure 2. Make these Write ROM settings to send a fax. (Refer to your Super Rom manual if you need help.) Thereafter, these settings remain in effect, unless you load a new WSPEC.CW file.

carriage returns and type your inside address, salutation, and body of text. End with the closing, followed by a blank line, your first name as you informally sign it, another blank line, and finally, your full name.

Now Exit (F8) and Map (F4) the letter. Center the body of text by inserting or deleting carriage returns between the date and salutation. What you see is almost what you'll get. The FROM and SUBJECT lines are deleted in the received facsimile, but everything else is accurately represented. Shorten your text if the Map function shows more than one page. Subsequent pages require a special procedure, explained later. Connect your modem cable, press Phne, then Find, type fax, and press ENTER. Now press Call, and your text is on its way.

HOW PHONE SIGNS ON AND OFF

A Write ROM PHONE log-on (Figure 1) has three parts rather than one as in TELCOM, following the telephone number. The first, the same as for TELCOM, is called the log-on script. The second, a new entry, is termed a sign-on script and is not used in this application, as evidenced by the absence of characters between the first set of braces ({}). The third, also new, is called the sign-off script (between the second set of braces). Unlike sign-on, sign-off is essential for proper operation of this application.

These two additions function differ-

TO: recipient's name>FAX 999-999-9999
FROM: your name
SUBJECT: topic of letter

Figure 3. You should use these as the first three lines in the text file you send to a fax machine. These lines must be accurately typed in or the sign-off script won't work.

ently from the original log-on text. They more closely resemble ordinary text files waiting to be uploaded and do not permit pauses, control-character notation, or the other special controls available from within the TELCOM log on. This presents certain difficulties, which you can overcome.

HOW TO USE PHONE WITH COMPUERVE

PHONE is intended for anyone needing to send frequent documents over the telephone to another computer. Sample scripts in the Write ROM manual illustrate sign-on/sign-off text for Action Telex and Western Union's Easylink. Unfortunately, scripts using the formats illustrated won't work on CompuServe.

CompuServe doesn't recognize commands sent by these scripts and sends back messages that it has received "unrecognizable commands." CompuServe's customer assistance department confirmed that their system can't recognize commands unseparated by a pause. Separating commands with semicolons, a trick that works elsewhere on the system, unfortunately won't work in EasyPlex.

What's the answer? Embed graphic

You can fax directly from the Write ROM word processor.

characters in the text. Since CompuServe accepts only the first seven bits of each character, it receives a properly selected graphic character as a control character (for a similar use of graphic characters, see previous articles on embedding printer codes in TEXT). Through experimentation, I discovered that CompuServe won't be confused when successive commands pile into its buffer if each carriage return is followed by a null character. For a null character, just type GRPH-. The seven-bit transmission strips off the high bit, and presto, you have a null. Similarly, GRPH-l (that's a lower case L) gives the equivalent of a CTRL-Z. I wasn't successful embedding the actual control character by using the WordStarlike CTRL-p keystroke sequence. It received these attempts in "carat" control notation (as used in TELCOM log-on syntax),

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which just results in two consecutive ASCII characters that don't produce any function on CompuServe.

HOW THE SCRIPT FUNCTIONS

Log on. The initial part of the log-on script is designed as described in your computer's TELCOM documentation. The label, FAX, permits the Write ROM PHONE menu function key command Find: fax to locate the correct script. M711E serves as a reminder for the correct Stat setting. Looking at the functional part of the log-on, contained between the angular brackets (<>), you find a pause, CTRL-C (CompuServe's start-up command), wait for U (User ID number prompt), wait for P (password prompt), wait for t (allows the initial CompuServe program to start running), transmit CTRL-P (aborts the top menu to get the prompt immediately), run the EasyPlex program, wait for the x in Easyplex, enter the EasyPlex command mode (to avoid delay of sending menus at 300 baud), enter the upload mode, select capture mode (ASCII, no error checking), and select no (don't prompt for each line) to allow upload of a continuous text block.

Sign on. The sign-on script goes between the first pair of braces ({}). This is unused because experimentation showed that the script was working bet-

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ter when it waited for prompts, only possible in the log-on. There is room for further experimentation in this matter. If the last part of the log-on could be moved into the sign-on, with no ill effects, you also could use the fax script by TELCOM to log on directly to EasyPlex.

Sign off. The sign-off script, between the second pair of curly brackets, waits until Write ROM has "printed" the text file to the modem, and then sends the GRPH-1 character, interpreted as CTRL-Z when the first seven bits are received by the host system. This tells CompuServe the text upload is over. EasyPlex responds in command mode with a prompt, and the script responds with *sen* (meaning send the text), *y* (yes, the "faxing" address is okay and, yes, it's okay to charge my account for the fax), and *off* (the standard CompuServe log-off command). After a few "garbage" characters appear, indicating loss of carrier, simply press the Exit key to return to the Write ROM main menu.

ADVANCED TOPICS

Simulated vs. real headers. Once you master the basics, you'll want your facsimile to resemble a real letter, with a formatted return address and telephone number at the top, and possibly an informative footer at the bottom.

You can't use Write ROM's built-in

COMMUNICATIONS

```
GRPH-clletterhead:
// STREET ADDRESS // POST OF
FICE, STATE // ZIP // Voice line
(999)999-9999 //
.he on
.fo on
GRPH-c
```

Figure 4. A simulated first-page Write ROM header file to make your fax look nicely formatted. You can also use %D in the Libr entry to place the date automatically, but beware—if your system date is wrong, you'll neither see it nor get a chance to edit it before the fax is sent.

header because no text must appear before the TO, FROM, and SUBJECT lines, or this information won't be recognized, and CompuServe sends prompts that your script file won't be expecting. If necessary, open the Write ROM manual to refresh your memory on the LIBRARY function. Then turn Libr ON with the cursor over the file where you intend to have your header.

For example, you could type in your first-page simulated header's library file entry as in Figure 4. My header is my mailing address. You should type the letterhead header library code directly

Once you master the basics, you'll want your fax to resemble a real letter.

below SUBJECT and immediately before the date. Don't leave any blank lines.

You should turn the built-in Super ROM header off with the function key so it appears only on pages following the first. I recommend using a phrase reminding the user to remove two lines before sending the "printed" text file, to keep in synchronization with the number of lines per page expected by the fax server. For example: ****Delete this and one other line on this page****. This header will never appear on a single-page facsimile.

Page footer. Like the header, the letterhead's dot command automatically turns on the footer. It can be either on or off at the function key setting. For footer text, I use a line requesting the addressees to notify me on my answering machine if they intend to respond electronically. For example: **** Notify VIA voice line for**

EasyPlex, TLX or FAX response**. This line appears on the last usable (but not the very last) line of each page.

Multiple-page facsimiles. Write ROM's inability to change page length with dot commands leads to an apparently insolvable problem in transmitting multiple-page facsimiles. For proper synchronization between your computer and the fax server, pages following the first have to be two lines shorter. The only way I can think of accomplishing this is first to "print" your text to an intermediate "dummy" file, edit out the extra lines, and then send the edited file.

You'll discover whether you need this procedure when you view the page layout using the Map key. If Map shows any lines flowing over to the second page, and you don't want to abbreviate the letter, a two-step procedure is required. While in Write ROM and with your text file open, press PRINT and select output to an intermediate file. I always use TEST.DO.

Open TEST.DO for text editing and find and remove the second (and all subsequent) pages' header and top margin lines. The header is easy to identify if you've used the text example recommended above. Trigger the fax server's form feed by putting a CTRL-L equivalent (i.e., GRPH-) at the end of the footer on each page, except the last. Exit to the Write ROM menu, press Phne, and turn the Fmtd formatting switch function key OFF.

Now transmit your previously formatted, edited, intermediate file, following all other steps as usual. This exercise is neither intuitive nor simple, but I find that 99 percent of my facsimiles can be contained on one page, making this two-step process mostly unnecessary.

Why does the problem arise? The TO, FROM, and SUBJECT lines lengthen the first page by three lines; the second and third lines are stripped off for the cover sheet. The first (TO) line is retained as the first line, and included in the 55 line-per-page total mentioned in the on-line documentation. Since you can use only 54 lines without triggering a form feed from the fax server (no way around this, according to CompuServe customer service), the first page contains 54+2, or 56 lines. Subsequent pages must drop back to 54 lines, or page break locations will be unexpected. If you accidentally use 55 lines, you'll know when the phone calls begin: "Gee, what a great looking fax you sent! But why did my machine make a blank page afterwards?"

Ronald A. Cameron is a practicing periodontist and dental educator and uses a Model 100 in conjunction with WordPerfect for office correspondence.

COMPATIBILITY: Tandy 100/102, 200, Olivetti M10, Kyocera KC-85. Untested: NEC 8201/8300 (see Editor's Note)

JIGSAW.BA

Hey, buddy, got a match?

by Joe Wasserman

It all started from a plastic puzzle my wife found while rummaging through her children's old toybox. It was named "Beat the Computer", of all things, although it was about as close to being a computer as the fingers on your hand. We played with it on and off for several weeks. One weekend when my kids came to visit they found it and were fascinated with it also.

Recently when my kids visited (ages 11 and 12) they asked if I had any new games for the computer. Since I hadn't written anything new for a while, my wife suggested I write a program to do "The Puzzle" for them. I agreed without giving thought to how or even if I could do it. And so the adventure began.

Drawing any particular piece somewhere on the screen is easy. The difficulty I found was in moving and drawing a piece in any of the positions it could occupy with a minimum of keystrokes to duplicate as closely as possible the ease with which the actual puzzle pieces could be moved. Another problem to overcome was that the real puzzle pieces could be flipped and rotated anywhere from one to eight different ways, depending on their shape.

After eliminating the idea of a grid system where each box would be numbered A1, A2, B1, B2, etc. around the outside of the

box, I settled on the "placement square" idea, using the arrow keys to move the square around the board. In this way your eyes aren't darting between the keyboard and the screen so much.

Next came locating the pieces on the board. To avoid the cumbersome use of *LINE* (A,B)-(C,D) codes I settled on a system of reference points. The start of each figure is the upper left corner from the locating square. The relative position of each successive point to the starting point is stored as a series of positive and negative integers in the *DATA* statements, along with print locations and *CHR\$* codes for the letters of the pieces used in the initial screen display.

I soon realized that, even with this method, the amount of

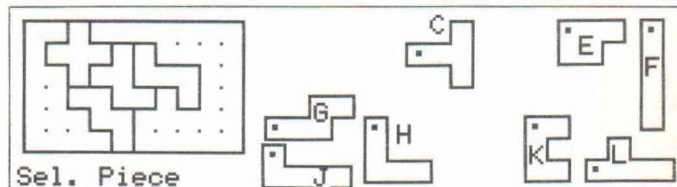


Figure 1. Can you arrange the pieces to fill the box completely? Hint: Don't rely on the partly completed puzzle here—this one leads to a dead-end.

```

Ø 'Copyright 1989 Joe Wasserman
1 'For the private entertainment and enj
oyment of Portable 1ØØ readers only.
2 'Not to be duplicated in any form what
soever without prior written permission.
5 CLS:PRINT@124,"Do You Want Instruction
s Y/N ";:S$=INPUT$(1):IFS$="Y"ORS$="y"TH
ENGOSUB685
1Ø CLS:DEFINT A-Z:PRINT@122,"A Puzzle by
Joe Wasserman 73117,36ØØ"
15 ONERRORGOTO46Ø
2Ø DIMB(9,5),P(1,11,3,1),R(11):A$="ABCDE
FGHIJKL"
25 RESTORE665:FORW=ØTO1
3Ø FORZ=ØTO11
35 FORY=ØTO3
4Ø FORX=ØTO1
45 READC:P(W,Z,Y,X)=C
5Ø NEXTX,Y,Z,W
55 CLS:LINE(2,2)-(82,5Ø),1,B
6Ø FORZ=1ØTO42STEP8
65 FORY=1ØTO74STEP8
7Ø PSET(Y,Z)
75 NEXTY,Z

```

```

8Ø RESTORE535
85 FORZ=1TO12
9Ø GOSUB52Ø
95 NEXT
1ØØ PRINT@28Ø,"Sel. Piece ";:P$=INPUT$(1
):IFINSTR("ABCDEFGH IJKLMNO",P$)=ØTHEN1ØØ
1Ø5 IFP$="M"THENMENU
11Ø IFP$="N"THENENGOSUB47Ø:GOTO1ØØ
115 IFP$="O"THENENGOSUB48Ø:GOTO1ØØ
12Ø R1=ASC(P$)-65:R2=R1+1
125 IFMID$(A$,R2,1)=" "THENBEEP:GOTO1ØØ
13Ø PRINT@28Ø,"Reverse Y/N ";:R$=INPUT$(
1)
135 IFR$<>"Y"THEN16Ø
14Ø R(R1)=1*-(R(R1)=Ø)
145 GOSUB44Ø
15Ø ONR(R1)+1GOSUB31Ø,375
155 GOSUB52Ø
16Ø A=38:B=3Ø:C=39:D=31
165 LINE(A,B)-(C,D),1,B
17Ø I$=INKEY$:IFI$=" "THEN17Ø
175 LINE(A,B)-(C,D),Ø,B
18Ø IFI$=CHR$(13)THEN235
185 ONASC(I$)-27GOSUB195,2Ø5,215,225:GOT

```

Continued

Listing 1. It's not as easy as it looks. While this program will run unmodified on a Tandy 200, a full-screen version is available on the BBS and our PTG disk.


```

0165
190 GOTO170
195 A=A+8:C=C+8:IFA>78THENA=6:C=7
200 RETURN
205 A=A-8:C=C-8:IFA<6THENA=78:C=79
210 RETURN
215 B=B-8:D=D-8:IFB<6THENB=6:D=7
220 RETURN
225 B=B+8:D=D+8:IFB>46THENB=6:D=7
230 RETURN
235 A1=INT(A/8):B1=INT(B/8):IFB(A1,B1)=1
THEN255
240 R=R(R1):FORZ=0TO3
245 M=P(R,R1,Z,0):N=P(R,R1,Z,1)
250 IFB(M+A1,N+B1)=0THENNEXT:GOTO265
255 IFE>=11THENGOSUB480
260 PRINT@280,"Pc. Won't Fit";:FORZ=1TO1
500:NEXT:PRINT@280,SPACE$(13);:GOTO100
265 FORZ=0TO3
270 M=P(R,R1,Z,0):N=P(R,R1,Z,1)
275 B(M+A1,N+B1)=1
280 NEXTZ:B(A1,B1)=1
285 MID$(A$,R2,1)=" "
290 ONR(R1)+1GOSUB310,375
295 A=A-4:B=B-4:LINE(A,B)-(A,B):READC,D
300 READC,D:IFC=0ANDD=0THENLINE-(A,B):GO
SUB440:E=E+1:IFE<12THEN100ELSEPRINT@100,
"You Did It ! !":PRINT@140,"Congratulati
ons":END
305 LINE-(A+C*8,B+D*8):GOTO300
310 ONR2GOSUB315,320,325,330,335,340,345
,350,355,360,365,370:RETURN
315 RESTORE535:RETURN
320 RESTORE540:RETURN
325 RESTORE545:RETURN
330 RESTORE550:RETURN
335 RESTORE555:RETURN
340 RESTORE560:RETURN
345 RESTORE565:RETURN
350 RESTORE570:RETURN
355 RESTORE575:RETURN
360 RESTORE580:RETURN
365 RESTORE585:RETURN
370 RESTORE590:RETURN
375 ONR2GOSUB380,385,390,395,400,405,410
,415,420,425,430,435:RETURN
380 RESTORE595:RETURN
385 RESTORE600:RETURN
390 RESTORE605:RETURN
395 RESTORE610:RETURN
400 RESTORE615:RETURN
405 RESTORE620:RETURN
410 RESTORE625:RETURN
415 RESTORE630:RETURN
420 RESTORE635:RETURN
425 RESTORE640:RETURN
430 RESTORE645:RETURN
435 RESTORE650:RETURN
440 RESTORE655:FORZ=65TO76
445 IFP$="F"THENLINE(226,2)-(234,42),0,B
F:LINE(199,24)-(239,32),0,BF:RETURN
450 READA,B,C,D:IFASC(P$)=ZTHENLINE(A,B)
-(C,D),0,BF:RETURN

```

```

455 NEXT
460 IFERL=185THENRESUMENEXT
465 IFERL=250THENPRINT@280,"Off the Boar
d";:FORZ=1TO1500:NEXT:PRINT@280,SPACE$(1
3);:RESUME100ELSEPRINTERR;ERL:STOP
470 PRINT@280,"Sure? Y/N ";:S$=INPUT$(1
)
475 IFS$="Y"THENRUN10ELSEPRINT@280,SPACE
$(10);:RETURN
480 FORX=1TO0STEP-1
485 FORY=0TO5
490 FORZ=0TO9
495 M=Z*8+3:N=Y*8+3
500 IFB(Z,Y)=0THENLINE(M,N)-(M+6,N+6),X,
BF
505 NEXTZ,Y
510 FORW=1TO20000*X:NEXTW
515 NEXTX:RETURN
520 READA,B:LINE(A,B)-(A,B)
525 READC,D:IFC=0ANDD=0THENLINE-(A,B):RE
ADC,D:PRINT@C,CHR$(D);:READC,D:LINE(C,D)
-(C+1,D+1),1,B:RETURN
530 LINE-(A+C*8,B+D*8):GOTO525
535 DATA87,10,1,0,1,-1,2,-1,2,0,3,0,3,1,
2,1,2,2,1,2,1,1,0,1,0,0,56,65,91,13
540 DATA114,2,2,0,2,1,3,1,3,3,2,3,2,2,1,
2,1,1,0,1,0,0,102,66,118,5
545 DATA141,10,2,0,2,-1,3,-1,3,2,2,2,2,1
,0,1,0,0,25,67,145,13
550 DATA168,10,1,0,1,-1,2,-1,2,1,3,1,3,2
,1,2,1,1,0,1,0,0,71,68,172,13
555 DATA196,2,3,0,3,1,2,1,2,2,0,2,0,0,74
,69,199,5
560 DATA226,2,1,0,1,5,0,5,0,0,118,70,229
,5
565 DATA90,37,2,0,2,-1,4,-1,4,0,3,0,3,1,
0,1,0,0,178,71,93,40
570 DATA126,37,1,0,1,2,3,2,3,3,0,3,0,0,2
23,72,129,40
575 DATA154,37,1,0,1,1,3,1,3,3,2,3,2,2,0
,2,0,0,307,73,157,40
580 DATA89,47,1,0,1,1,4,1,4,2,0,2,0,0,29
8,74,92,50
585 DATA184,37,2,0,2,1,1,1,1,2,2,2,2,3,0
,3,0,0,271,75,187,40
590 DATA206,53,1,0,1,-1,2,-1,2,0,4,0,4,1
,0,1,0,0,276,76,209,56
595 DATA87,10,1,0,1,-1,2,-1,2,0,3,0,3,1,
2,1,2,2,1,2,1,1,0,1,0,0,56,65,91,13
600 DATA114,10,1,0,1,-1,3,-1,3,0,2,0,2,1
,1,1,1,2,0,2,0,0,102,66,118,13
605 DATA141,2,1,0,1,1,3,1,3,2,1,2,1,3,0,
3,0,0,26,67,144,5
610 DATA168,18,1,0,1,-2,2,-2,2,-1,3,-1,3
,0,2,0,2,1,0,1,0,0,68,68,171,21
615 DATA196,2,3,0,3,2,1,2,1,1,0,1,0,0,75
,69,199,5
620 DATA199,24,5,0,5,1,0,1,0,0,118,70,20
2,27
625 DATA87,29,2,0,2,1,4,1,4,2,1,2,1,1,0,
1,0,0,176,71,90,32
630 DATA126,53,2,0,2,-2,3,-2,3,1,0,1,0,0
,222,72,129,56

```

Continued

code required to define all the possible ways to view the pieces would gobble up RAM space at a phenomenal rate. I decided to offer a choice of only two views of each piece, since the number of ways they could be arranged would still be large enough to make the puzzle a challenge.

The only other problem I encountered was the difficulty in telling an empty space from an occupied one after several pieces had been placed. A subroutine to darken the empty boxes for a short time solved that problem, and makes an interesting display while the game is running.

Editor's note: JIGSAW.BA makes heavy use of the LINE statement, for which there is no direct NEC equivalent. However, files #681 through #683 on GENIE's Laptops Roundtable will can be used to create LINE capability on NEC notebook computers. Having done that, it should only be necessary to change the PRINT@ statements to NEC's LOCATE equivalents (detailed in NEC modifications for programs in previous issues) in order to make the JIGSAW.BA run on NEC's. While this version does run on the Tandy 200, a modified, full-screen version is available on our BBS and this month's PTG disk.

-MN

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```
635 DATA154,45,2,0,2,-1,3,-1,3,1,1,1,1,2
,0,2,0,0,308,73,157,48
640 DATA90,55,3,0,3,-1,4,-1,4,1,0,1,0,0,
297,74,93,58
645 DATA183,37,2,0,2,3,0,3,0,2,1,2,1,1,0
,1,0,0,232,75,186,40
650 DATA204,53,2,0,2,-1,3,-1,3,0,4,0,4,1
,0,1,0,0,277,76,207,56
655 DATA87,2,111,26,114,2,139,26,141,0,1
66,26,168,2,193,26,196,2,220,18,0,0,0,0
660 DATA87,29,122,45,126,37,150,62,154,3
7,178,62,89,47,122,63,183,37,200,61,204,
45,239,61
665 DATA1,-1,1,0,2,0,1,1,1,0,1,1,2,1,2,2
,1,0,2,0,2,-1,2,1,1,-1,1,0,1,1,2,1,1,0,2
,0,0,1,1,1,0,1,0,2,0,3,0,4
670 DATA1,0,2,0,2,-1,3,-1,0,1,0,2,1,2,2,
2,0,1,1,1,2,1,2,2,0,1,1,1,2,1,3,1,1,0,0,
1,0,2,1,2,1,0,1,-1,2,0,3,0
675 DATA1,-1,1,0,2,0,1,1,0,1,1,0,1,1,-1,2,
-1,0,1,0,2,1,1,2,1,1,0,1,-1,1,-2,2,-1,1,
0,2,0,1,1,2,1,1,0,2,0,3,0,4,0
680 DATA1,0,1,1,2,1,3,1,1,0,2,0,2,-1,2,-
2,0,1,1,0,2,0,2,-1,1,0,2,0,3,0,3,-1,1,0,
1,1,1,2,0,2,1,0,2,0,2,-1,3,0
685 CLS:PRINT"Use Upper Case ONLY":PRINT
:PRINT"Object is to fit the 12 pieces in
to the rectangle with no space left unus
ed."
690 PRINT"Piece to be played is selected
by its letter (A to L)":GOSUB750
695 CLS:PRINT"Each piece has a small squ
```

```
are used for locating on the playing ar
ea.";
700 PRINT" Pieces can be reversed when p
rompted except for A (no change) and F (
90 degree rotation). ":GOSUB750
705 CLS:PRINT"After selection a square w
ill appear on the board which is moved b
y using the 4 arrow keys. ";
710 PRINT"After selecting a location on
the board, the piece is placed with it
s square ";
715 PRINT"in the same location as the b
oard square by pressing ENTER.":GOSUB750
720 CLS:PRINT"Pieces cannot be placed wh
ere they won't fit or outside of the bor
der."
725 PRINT"The following can also be be u
sed at the'Sel. Piece' prompt:"
730 PRINT" M end game-return to MENU":P
RINT" N start NEW game":PRINT" O revie
w spaces still OPEN":GOSUB750
735 CLS:PRINT"Once placed, a piece canno
t be moved. If a piece is selected and n
ot placed it can be changed ";
740 PRINT"by placing it in a posi- tion
it won't fit. You can then select anothe
r piece or rotate the curenent piece"
745 PRINT@287,"Press any key to start ";
:$=INPUT$(1):RETURN
750 PRINT@287,"Press any key to continue
";:$=INPUT$(1):RETURN
```

End of listing.

COMPATIBILITY: Tandy 100/102.

BAR+

This flexible bar code system gets high marks.

by Mo Budlong

As author of the *RBASIC* and *C100* Option ROM compilers, I suppose I would be classed as a techie, but in the area of bar coding I am a simple user. I understand the theory of bar coding and have used bar codes in systems I've written, but to me they are basically black boxes I add to systems I write or use.

Consequently I approached this product with a user viewpoint. "What can it do for me?" Briefly, the answer is "Quite a bit."

BAR+ works with the Tandy scanners, but the package I reviewed included Optical Data Systems' MSH-510 hand scanner. I have always preferred this scanner over the Radio Shack device. It looks and feels more substantial, and I know from previous work with it that it stands a great deal more abuse than the Tandy wand. It is also more accurate. The failure rate is very low compared to the Tandy. I have used both wands with the Tandy bar code software and the BAR+ software. The Optical Data scanner is just better.

The real centerpiece is BAR+ itself. This is a software package on an option ROM for the Model 100 or 102. The manual includes installation instructions similar to any other ROM on the market and very simple. Plug it in, type *CALL 63012*, and press *ENTER*. BAR+ is an effort to create a program that encompasses many, if not most, of the bar coding applications a user might want on a portable.

SIX BASIC MODES

The system consists of six basic modes of bar code work. In each of these six types lies a range of options and configurations that customize the system to suit your needs.

1. *RECORD* applications let you scan a

bar code (on an item) and then record data about the item, the mode used for inventory taking. Scan the code and then enter the quantity. BAR+ provides several extensions to this, including a built-in calculator. For example, I configured an inventory system that would allow you to swipe the bar code, then enter a description followed by numeric entries to be summed into the total of items on hand. So, to inventory boxes of Teddy bears at 15 to the box, you could type $3 * 15$ (for three full boxes) + $10 + 2$ (for the contents of two partially filled boxes). This makes inventory a breeze and is a feature of the systems used by inventory firms to avoid the users doing the mathematics by hand.

RECORD mode would also work for field data collection, such as recording meter readings or the results of other data recording devices. Swipe the meter's bar code and then key in the reading.

2. *PICK-LIST* applications use an input and an output file and are normally used for order-filling. The pick list resides on the computer and is displayed a line at a time. The operator scans the product (after picking it from a shelf, for example), and the computer warns the operator if he or she doesn't match the expected item with the picked item.

Usually a pick list would be downloaded into the Model 100/102 from a host system and used to guide someone filling an order.

3. *LOOK-UP* applications use an existing file that must contain the bar code and may contain up to four additional fields. The operator swipes the bar code. The computer searches the data file for a matching code and displays the code and any additional fields, which the operator may update. I actually worked on a system that needed this product. Container-



Photo 1. The MSH-510 LED barcode scanner, one of the many available from Optical Data Systems.

Manufacturer's Specifications

BAR+ \$195.00—includes ROM software and manual

Optical Data Systems, Inc.
P.O. Box 1987
Escondido, CA 92025
(619)745-6563

Hardware required:
Tandy Model 100/102
Bar code reading wand
Optional Printer: Tandy DMP-200
(and many others)

Optical Data Systems supplies many types of bar code scanners. The MSH-510 pistol-grip LED bar-code scanner mentioned in the review sells for \$109.00. Visible red and infrared versions are also available.

ized cargo stored in a large yard was frequently moved around, but the main office had to know the locations of the containers. A file of containers and yard spots could have been loaded to the Model 100/102 so that a yard clerk could swipe one up on the screen. If the spot had changed, he could key in the new spot and save it to a file. The resulting file could then be uploaded and the master files on the host modified.

4. **CHECK** mode is a quality control system allowing you to verify the correctness and quality of generated bar codes. This is an important application for vendors under contract to ship correctly coded goods. This mode doesn't replace the expensive and sophisticated equipment used to control bar code quality, but it does provide a few simple checks by an untrained operator, which allow a much broader sampling base for testing.

5. **PUB-CALC** is a specialized version of **RECORD** but for inventory taking on UPC-encoded books and magazines.

6. **JOB-TIME** mode can be used as a time clock or for time and motion tracking on a production line. In its simplest form, you swipe a bar code and the Model

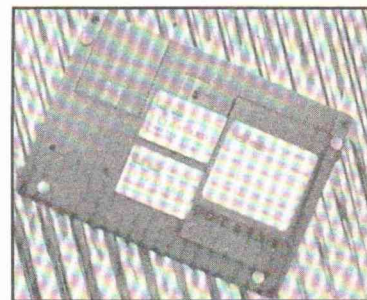
Continued at top of next page.

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Circle 133 on reader service card.

Bar Code 101: An Introductory Course on the Little Black Bars by Debra Marshall

Bar code (bār kōd) *n.* 1. a systematically arranged and comprehensive collection of regulations and rules of procedure or conduct maintained and enforced in drinking establishments: last call is last call, and don't try to push it, buddy. 2. a confusing and bewildering collection of regulations and rules of procedure and conduct written in post-Romano-Anglo-gibberish, said to guide the behavior of lawyers: *ex postu late-Oh!* 3. those black-and-white stripes you find on books, grocery packages, drug store items, bottles of wine, clothing store tags, cardboard boxes, envelopes, whatever: They control your life more than you realize.

We are now going to discuss the what and why for behind definition numero 3. Take notes. When this is over, you will be quizzed, and you will be expected to know more than you ever thought possible about bar codes.

WHAT

A bar code is, indeed, a collection of black-and-white stripes running parallel to one another—a collection of bars of various widths. Most bar codes in use today are in the form of rough squares or

rectangles, but bar codes can be printed in circles as well, which then take on the aspect of a psychedelic bull's eye. The bars (and spaces) represent the numbers that usually appear printed below the code itself. Software in the bar-code scanner or computer decodes these bars into numbers for other software to use.

Briefly, the code is formed by the relationship of white space to dark space. This code is "read" using a bar code scanner—that hand-held device with incarnations that resemble a light pen, electric shaver, space-age ray gun, or that in-counter slot reader that the grocery store clerk drags your purchases over (you know, the slot with the red eye that beeps at you, and is always covered with bits of lettuce and milk slime and who-knows-what-all-else from leaking packages). Using laser or charge-coupled-LED (light-emitting diode) light from the bar code scanner shined onto and across the code, the scanner or computer interprets the light pattern reflected from the label or page as numbers. The computer relays these numbers to its applications software, which works with them. The scanner is always connected by cord, radio

frequency transmission, or batch upload to the computer, and the software, usually a database plus, turns the numbers into sensible data.

Even with this simplified explanation you can guess some of the errors that can cause a bad or nonexistent read: scanners that won't focus on the bar code; bar codes printed so badly that the reader can't tell black stripe from white; teeny, tiny codes that can't be read for the same reason; wrinkled codes, dirty codes, smeared codes, and scratched codes; and software that can't interpret what the scanner is seeing. The industry uses a lot of technical terms, like *depth of focus* and *reflectivity* and *width-to-height ratios*, that get complicated here—anyone seriously interested should consult a text on the subject.

Unlike roses, a bar code is not necessarily a bar code. Bar codes exist for every reason and every user. The ones on your groceries are called UPC codes, and are the Codes Universally used on grocery Products. But the government, manufacturing, druggists, clothing retailers, publishers, you-name-it favor many other

Continued at bottom of next page.

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Continued from previous page.

100/102 adds a date and time stamp to the entry. User entry is optional and could allow the user to identify the type of job started on a production line.

Each of the basic modes allows flexibility over prompts, file layout, operator identification, job numbers, and batch numbers. The modes and flexibility are

Continued from previous page.

codes: Interleaved 2 of 5, Code 39, Plessey, Code 45, UPC-A, -B, and -C, to name a few. Some can be read from either direction, some only from left to right, some include checksum digits, some have stop and start characters, some are especially designed for teeny, tiny *geographies*. Some people even design their own codes so no one else can read them. If the decoding software you're running isn't the right software for that bar code, jest fergit it, my friend, you ain't ever gonna get a good read from that code.

Which bar code is preferable for which application, and which bar code reader and/or scanner (a *bar-code reader* is a scanner that includes the software that makes sense of the collected signals, a *scanner* simply collects signals and passes them on) is well suited for code and application is a discussion best taken up in a book, not for a review sidebar.

Just take my word for it that before a developer chooses a bar code for any application, several factors are considered: 1. How much money is available for this operation? 2. Will the bar code be used by entities that have their own specifications for certain codes (like the Department of Defense, grocery stores, many retailers, and the like)? 3. What will the *geographical environment* for the code be like? Is there lots of space for it, just a little? Must it be

REVIEW

the great strengths of *BAR+*. The problem in trying to put together a generic bar coding program is that bar coding is really intended to be an alternate input device. Imagine trying to create a generic keyboard input program, and you will get some idea of the magnitude. Input to what? To do what? Lookup, save, or cross check or or or ... ?

Optical Data Systems has done an excellent job of capturing a wide range of applications in one program.

The manual is a gold mine of technical information.

OTHER FEATURES

BAR+ includes a bar code printing program. I did not have the required printer, so I could not test it, but I worked with one of their printing routines about two years ago, and I liked it. I assume this one will be the same good quality. The calculator cited above is also available

from the menu as a stand-alone calculator. One useful feature allows it to calculate bar code check digits. A sort utility lets you sort the input or output files by position within the record. This is handy, because host systems frequently require that the data being uploaded to them is in sorted order.

DOCUMENTATION

The manual is a gold mine of technical information, but it could be better organized. I found it slightly frustrating to get started. The first few chapters cover the Model 100/102, why bar codes are used, bar code basics, printers and scanners, and bar code applications. It isn't until Chapter 4 that the manual covers what I feel should be on page 1, Installation and Getting Started.

Once I had everything hooked up, I turned eagerly to Chapter 5, ready to start scanning. Instead, Chapter 5 covers how to use the calculator, and Chapter 6 covers sorting and general file management techniques. Chapter 7 finally gets to the nitty-gritty. After a bit of reading, I created my first *BAR+* application and my apprehensions disappeared. My advice to new users is to skip to Chapter 4 and then Chapter 7. Get a simple application

located in a certain place on an item? Is it going on a curved object, an object that requires manual or mechanical application, an object that requires a special adhesive? 4. What's going to be encoded in this bar code? Can we use sequential codes (consecutively numbered or lettered), or must they be meaningful codes

What will the geographical environment for the code be like?

(information on each item contained within the bar code)? If your answer is "must be meaningful," think again—very few applications really require any but sequential codes. That's what the database software is for; it stores the meaning of the code for each item. 5. What is the environment this code will be subjected to? High or low temperatures, frequent scanning, acid baths, water, snow, hail, bugs or vermin, grease, soot, sawdust? 6. How are we going to produce

and scan these codes (see numbers 2, 3, 4, and 5)? 7. Are there considerations idiosyncratic to this application?

For detailed bar code information collected in one spot, I suggest acquiring a copy of *Reading Between the Lines*, by Russ Adams and Craig Harmon, published by Helmers Publishing, 174 Concord St., P.O. Box 874, Peterborough, NH 03458. Additional literature that can be handy for people into serious bar code applications and technology include *ID Systems*, a monthly magazine by the same publisher, and *Automatic ID News*, a monthly tabloid published by Edgell Communications, 7500 Old Oak Blvd., Cleveland, OH 44130. Each is a controlled circulation publication, which means they're free to qualified subscribers and unavailable to everyone else.

WHYFOR

Now that you have been introduced to a simplified version of the *what*, let's look at *whyfor* people in their right mind develop a personal relationship with a bar code and its reader.

You can make almost any kind of information accessible through a short bar code. Once the identifying number is encoded, the information associated with it can be made accessible through, or changed by, any computer or terminal or processor networked with the central

up and running; then go back to Chapters 5 and 6.

Chapters 1, 2, 3, and 9 contain some of the best background and technical information I have ever read on bar coding. If I ever want to roll up my sleeves and get "down and dirty" with bar code technology, I'd start with the *BAR+* manual.

SUPPORT

The technical support line is helpful, and you get a strong feeling that you'll never be left stranded. Once at the end of a helpful call, I asked a question out of curiosity. When I realized that the support person didn't know but was trying to find an answer, I quickly pointed out that my application didn't need it and was just an off-the-cuff question. A week later I got a packet of material in the mail with a very complete answer.

SUMMARY

Whether you are an end user implementing bar codes in your business, a value-added reseller putting together a bar code-based package, or a programmer interested in the ins and outs of the technology, this system will be a valuable addition to your work.



database. Almost any application that requires a unique identification of members of like groups can be made more reliable, time and cost efficient, and less prone to human error, through the use of a bar code system.

In other words, if you're a gizmo manufacturer, and if you need to track the location of each of your gizmos, and you've got a lot of them, and they could be in one of many places at any time; and if you also want to keep track of anything that's been done to each gizmo; and if you want the latest updates of information always available to you; then you could probably use a bar code system.

Take two examples. First, a manufacturer makes T-shirts with no sleeves, short sleeves, long sleeves; with v-necks, crew necks, and turtlenecks; with and without buttons; in fifteen colors and as many sizes. And this manufacturer also does custom jobs for some very large and important customers. If he is smart, this manufacturer is going to assign bar codes to everything: T-shirt lots identifying them by style, color, size; locations in his manufacturing plant (arm sewing, button sewing, dyeing, collar finishing, quality control, shipping, receiving); orders from customers; inventory and warehousing locations. Everything. By doing this the manufacturer gains a computer that can tell him at any time exactly how

many yellow, v-neck, short-sleeved T-shirts he has in stock, whether it's too late to change that custom order for 4,000 puce T-shirts to carmine, whether the order of green shirts was shipped this morning, on what truck, and its estimated arrival. It can also tell him that Sandy, who's been complaining about his sewing machine malfunctioning, has been producing T-shirts with sleeves that fall off when they're tugged.

A second example is the photographer who sends a lot of color slides to stock agencies every year. Thousands, in fact, to several different agencies. In the very small space of the 35mm slide holder, she needs to record an identification of the photo, including where and when it was taken and in what section of what slide file the slide is stored at her office, what agencies she's sent it to and when it's returned, whether it made her any money, copyright information, private sales, and any other details that's important. Can you write that small? Bar codes, bar codes, bar codes!

This is not to say that there aren't inefficient or dumb uses for bar codes. For example, bar coding the recipes in the average kitchen ranks right up there on the inefficient scale with writing average household checks using a computer. Using bar codes in applications that need accurate, quick, and human-verifiable

identification can cause more trouble than the user ever bargained for (i.e.: as the only identifier on drug packages in a pharmacy). Sticking bar codes that aren't printed well, aren't verified, or are inappropriate for the application on anything is a truly dumb use of them.

But including a bar code system in a portable computer? This is a wonderful, smart, excellent plan. After all, the main point behind bar coding objects is to be able to identify them efficiently and accurately and to store and access lots of information about them. Think of the applications that open up when you can bring the computer to the object rather than vice versa! Bar code applications using portable computers today include veterinary exams on race and breed horses, recording information about tagged salmon by Fish and Game employees, and checking parking violators for unpaid fines.

Class dismissed.

Debra Marshall is former editor of Bar Code News and former managing editor of ID Systems. Currently she is writing for Automatic ID News and for Retail Information Systems News. She is also consulting for B.O.I.S. Marketing Group at Digital.



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- Data Connector: 40 pin male/female (specify 100 or 102 when ordering)
- Power Consumption: 6-volt/200 mA (AC Adapter included)
- Weight: 8 ounces
- Color: Black
- Dimensions: (LxWxH) 11.5" x 2.75" x 0.875"
- Software Driver: 1.8K ram, relocatable (Specify cassette/disk)
- RS-232 interface unused
- Option ROM socket unused
- Monitor not included as shown
- Coming soon for Tandy 200/KC-85/NEC



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COMPATIBILITY: Tandy 100/102 (Tandy 200 version under development).

RBASIC: A Model 100 BASIC-to-Option ROM Compiler

Now save memory and protect your BASIC programs.

by Stan Wong

Psst, hey buddy. Suffering from the RAM-cram blues? Ya wanna add 32K of extra memory to your Model 100/102/200 for your BASIC programs? It's cold-start proof. It'll set you back less than \$200. Well ... do I have a deal for you.

Option ROM software development for the Model 100 has been a closely guarded secret of large software development houses. M. J. (Mo) Budlong of King Computer Services (KCSI) publishes a book *Secrets of ROM Revealed* (see review in April '89 issue), which details the techniques of programming for the option ROM socket. That technical information is of use to only the machine language programmers, the same people that create .CO programs.

Mo now has brought option ROM programming to the rest of us. RBASIC from KCSI compiles all your BASIC programs so that you can create an option ROM device. Although RBASIC is intended to compile programs so that you can run them as an option ROM program, you can also create standard .CO programs to run from RAM memory. All the option ROM secrets detailed in his book *Secrets of ROM Revealed* are embodied in RBASIC.

RBASIC PACKAGE

The RBASIC package includes a 8.5-by 11-inch spiral-bound manual and a 5.25-inch MS-DOS diskette. The diskette contains all the software you'll need to create an option ROM program. You have to supply the following hardware: an IBM PC-compatible computer with two floppy disk drives (at least, required) or a hard disk (recommended, by me), a null modem cable, a Model 100/102, an EPROM programmer, a 27C256-250 EPROM (32Kx8), and option ROM adapters.

The software supplied includes the following programs: RCV, which sends the BASIC program from the M100 to the PC; RBASIC, the compiler; A100, the assembler; SND, which sends the program from the PC to the M100; and COLOADER, which creates a RAM version for testing.

BACK TO BASICS

RBASIC for the Model 100 is a cross-compiler that runs on an IBM PC or compatible. It creates data that you can load into an EPROM, solder into a conversion board, and plug into and run

File Sizes and Statistics

Program	File	Size (bytes)	Time (min:sec)
VT100	BASIC	3,840	n/a
	Assembly	32,477	0:09
	Hex(Ram)	18,660	0:40
	Hex(Rom)	19,448	0:40
	ROM	7,650	
EM8SIG	BASIC	13,696	n/a
	Assembly	127,536	0:37
	Hex(Ram)	—	
	Hex(Rom)	73,205	4:10
	ROM	26,789	

Table 1. Statistics for the two programs compiled by the author using King Computer's RBASIC compiler.

directly from the Model 100's option ROM socket.

RBASIC is not a true compiler; its primary intent is to produce ROMmable programs. See the sidebar for a discussion on the difference between a compiler and an interpreter and a little bit about option ROM's and EPROM's.

Since RBASIC is a semi-compiler, the resulting program is partially compiled. The rest is left for the built-in BASIC interpreter. The compiled program can run either faster or slower depending on the

programming constructs used. Overall, the speed increase or decrease probably averages out. The output file is anywhere from 10 to 30 percent larger than the original, depending on the options you choose. The size increase should pose no problem if you load the program into an option ROM—you have 32K of option ROM space to play with.

WHY USE RBASIC?

Why do you need RBASIC? If you have any of the following requirements then you should consider this product:

Large application. A Model 100 has about 29K of free RAM space. A large program can use all this space but leave no room for other data. Since the main application of RBASIC is to produce ROMmable code, you have up to 32K of additional memory space available without using any precious RAM memory.

Code Security. RBASIC converts your BASIC program into assembly language. If you have trade secrets to protect, or are embarrassed by your coding ability, your source code is safe from prying eyes. I feel that many powerful applications were never developed or distributed for the Model 100 simply because people or companies did not want to give away their business—that is, the source code.

Code Integrity. Not having a BASIC program in memory means that some well-intentioned person can't "improve" your program. However well intentioned this person may be, he or she may create unwanted side effects while trying to tweak your program. This is important if you are creating *turnkey* applications (that's *turnkey* not *turkey*—the former being a custom program completely set up so that the end user does not have to understand anything about the machine that the program is running on, just turn the power key on and get your job done—

the latter phrase describes programs I write).

You aren't a machine-language programmer. You don't need to know anything about machine or assembly language to use RBASIC.

PLUG 'N PLAY

Running on IBM PC compatibles, the RBASIC program installs simply: just copy all the files on the supplied MS-DOS diskette to your hard disk (not required but I would very strongly recommend having one, with large support files and compiler output).

My major complaint with RBASIC is its documentation. The manual is not very clear about the sequence of operations. The formatting of the text makes it hard to distinguish what paragraphs are peers or subparagraphs to other topics. But with a little bit of patience everything becomes clear. The manual is written more like the *Secrets of ROM Revealed*: by a programmer for a programmer. RBASIC appeals to a wider community of Model 100 users that may not be as computer literate as the *Secrets* reader.

With a lot of reading and re-reading, I was able to follow the step-by-step instructions and create a working option ROM program from a BASIC program.

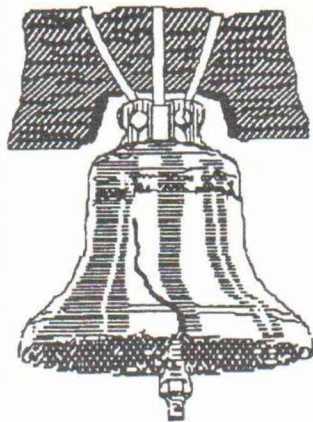
CREATING AN OPTION ROM PROGRAM

Developing a BASIC ROM is easy. Just following these steps:

- Write and test your BASIC program on the Model 100
- Transfer the program to your PC (RCV)
- Run RBASIC and create a .CO file using the /O switch
- Assemble the RBASIC output (A100)
- Create an M100 program to load the .CO on the M100
- Transfer the .CO program to the Model 100 (SND)
- Verify that the .CO runs the same as the .BA program
- Recompile to a ROM image on the PC (no /O switch)
- Assemble the output (A100)
- Download the HEX file to your EPROM programmer
- Mount the EPROM in an adapter
- Plug it in and go!

As you can see, the procedure above includes a lot of file transfers between the PC and the Model 100. They go fairly quickly at 9600 baud, though.

I chose two BASIC programs to test RBASIC. VT100.100 is a VT100 terminal emulator. The program is available from the CompuServe M100SIG. As such it has its "hooks" into the LCD and modem



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functions. It uses BASIC interrupt constructs such as ON MDM very extensively. The second program is EM8SIG.400 also available from CompuServe. EM8SIG is an automated electronic mail and forum activity utility.

Both of these programs extensively use the Model 100 BASIC language facilities, including calls to the system ROM and interrupt driven I/O. If RBASIC could handle these two programs, I figured, then it should be able to handle anything you can give it.

I first ran the VT100 program and connected to a VAX-11/785 computer to verify that everything was working properly. My second test was to compile the program to a .CO file. Again, everything worked as advertised. My last test, the acid test, was to create an option ROM device. I plugged it into my test setup and turned on the power. Staring back at me was the familiar M100 menu with an extra entry after SCHEDL. It read VT100. Could it be? Holding my breath, I put the widebar cursor over VT100 and pressed ENTER. I was startled when the program worked as always. It continued to function flawlessly from the opening menu to dialing the remote computer to final logout. I was flabbergasted. It was so easy. Too easy. But it *was* that easy.

Now I'm ready to put all my BASIC programs into a ROM and ... wait a min-

ute! This is too simple. There must be a catch. There is. Only one BASIC program can go into the ROM. The solution is simple, though. Write a little menu driver to select the different programs, then renumber the different programs and merge them into one file. Now you can have all your favorite BASIC functions always available, not use up any of your precious RAM, and not have to reload after a cold start! That feature alone is worth the expense and effort. There is at least one advertiser in P100 that will assist you in converting your programs if you don't feel up to it technically.

THE NULL STATEMENT

One important item I found during my tests: The type of null modem cable you use is very important. All null modem cables/adapters are not the same! There are at least a dozen different cable configurations sold. The "generic" null modem adapter I purchased for testing wasn't quite right. My advice is to go to your local Radio Shack dealer and purchase their "Null Modem Adapter" (Cat No. 26-1496A, \$7.95).

VIVE LA DIFFERENCE!

RBASIC syntax is slightly different from that of M100 BASIC. Most of the differences relate to interpreted BASIC versus compiled BASIC. For instance, the

following program is legal in Model 100 BASIC:

```
10 GOTO 30
20 GOTO 100
30 BEEP
40 END
```

BASIC never sees statement 20 because it interprets the program line-by-line. The GOTO 30 in line 10 causes line 20 never to be interpreted. This program still produces the intended "beep," but line 20 is dead code. It serves only to take up precious memory and confuse anyone reading the program. RBASIC, a compiled language, analyzes all statements. Line 100, referenced in statement 20, would become an "undefined symbol."

Some BASIC commands are not

supported: MERGE, EDIT, and NEW apply only to interpreted BASIC and are not supported by RBASIC. If your program has an EDIT statement where the user to modifies the program and data while it's running, you clearly will have a problem porting your application to RBASIC.

Interpreted BASIC lets you get sloppy. For instance, FOR-NEXT loops are supposed to be terminated with a NEXT <counter variable> statement:

```
10 FOR I = 1 TO 10
20 J = J+1
30 NEXT I
```

But M100 BASIC lets you leave the <counter variable> off the NEXT statement; thus,

```
10 FOR I = 1 TO 10
20 J = J+1
30 NEXT
```

is perfectly legal. But not to RBASIC. For the two programs I tested, the FOR-NEXT statements were the only ones I had to change. The exception was the EM8SIG program, which uses the EDIT statement. Only a program redesign would take care of that problem.

COMPILER SWITCHES

The compiler's command line switches control special features of RBASIC. It pays you to become familiar with them to optimize the code speed, size, and functioning of your program.

Nine switches modify the action of the RBASIC compiler and are simple to understand, if you can find them. The page layout of Chapter 5, "Compiler Switches" does not make for easy reading. The paragraph headings for each switch blend in with the examples.

An example is the /B switch, which checks for the BREAK-PAUSE keypress. If you use ON KEY logic in your program, then you need to use this switch. RBASIC adds additional code at the start of each line; otherwise it ignores the BREAK-PAUSE keypress. This increases the size of your compiled program as well as adds additional (but probably not noticeable) execution time. The former may make a difference depending on how large your program is.

INSIDE RBASIC

The compiler output is in two phases. The first step produces an assembly language source code file that shows exactly what the compiler is doing, and also allows the file to be modified. The assembly source is then assembled into a .HEX file that you can load to an EPROM programmer or the Model 100/102.

Let's examine the output from RBASIC. The compiler produces "semi-compiled" code in the form of assembly-language statements. The A100 program included with the package turns this into a form that you can transfer to the Model 100 and run.

Consider the following compound BASIC statement:

```
1 G$="" : A=0
```

which assigns an empty string to the string G\$ and the value zero to the integer variable A. See Listing 1 for the output from the compiler with my annotation. The critical point to note is the call to XLET. RBASIC lets the BASIC interpreter in the system ROM do all the work. The DB statements define the same BASIC tokens as you'd find when you store a BASIC program in its .BA form.

Jargon:

Compilers, Interpreters, Tokens, Option ROM

COMPILERS AND INTERPRETERS

Model 100 BASIC is an interpreter. RBASIC is a semi-compiler.

A compiler is a program that translates an entire "source" program (e.g., a .BA file in ASCII form) all at once, into a machine language "object" program. Thereafter, the object program (a .CO file) can be executed quickly and directly, with no further translation, by the 8085 microprocessor inside your Model 100/102/200.

An interpreter, on the other hand, is a program that translates and executes, each statement in a .BA source file, one at a time, as it encounters them. It must do this each time you run the program. (To save space, the Model 100 converts BASIC keywords and stores them as tokens in the source file.) If you think about it, the interpreter program (BASIC on the Model 100 menu) has lots of overhead, since it must run itself (a compiled program) as well as interpret and execute the tokenized .BA source file. This is why interpreted languages run slowly compared to compiled programs, which run without an intermediary.

RBASIC is a semi-compiler. It translates your source file into an object program consisting of a machine language "skeleton" and a series of BASIC tokens. The Model 100 microprocessor executes the machine language directly, while tokens are passed to the BASIC interpreter in the system ROM for translation.

TOKEN OF APPRECIATION

A token is a one-byte code that represents a BASIC keyword or statement. Thus the BEEP and CLS statements are stored as one-byte tokens versus three to

four bytes as an ASCII string. That's why the .DO form of a BASIC program is larger than the .BA form.

A routine in the system ROM, the interpreter, is the heart of the BASIC program. RBASIC uses this routine by feeding it a series of BASIC tokens, and the interpreter does the rest.

OPTION ROMS

Option ROM's are those little chips that you can plug into the bottom of your machine. They give your machine 32K of extra memory for programs. The catch is that this is "read-only" memory (ROM). This means that you can't use this memory for normal .BA programs and data. Once a program is engraved into an option ROM you can't really change it, so you had better get all the bugs out! On the other hand, a cold start won't blow your program away.

The Tandy option ROM socket uses a non-standard pinout. In addition, the socket is incompatible with industry-standard EPROM's (erasable, program-mable read-only memories). Tandy makes an adapter board (p/n AXX-7113—\$10.02 from Tandy National Parts) that reroutes the pins to match the option ROM socket and serves as a carrier to fit the socket itself. See the *Secrets of ROM Revealed* article in the April '89 issue of *Portable 100* for more details.

Stan Wong is a programmer in the defense electronics industry. He is surviving a hostile corporate takeover by writing programs for his Model 100. You can reach him on CompuServe ID 70346,1267. Writing to P.O. Box 28181, Santa Ana, CA 92799 will also work.

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```
X2:          ; branch point from previous line
;1 G$="" : A=0 ; the statements being compiled
L1:          ; label for line 1
  LXI H,1    ; store the current line number
  SHLD BASLIN ; for BASIC interpreter
  LXI H,X3   ; load address of next statement
  CALL XMAKERR ; ON ERROR handler
  CALL XONCHK ; ON interrupt handler (e.g. ON MDM)
  STDROM BRKHDL ; ctrl-break check
  CALL XLET   ; perform the assignment (G$="")
  DB 71,36,221,34 ; BASIC tokens used by the BASIC
  DB 34,208,34,34 ; interpreter in standard ROM
  DB 0
X3:          ; code for next statement (A=0) here
```

Listing 1. The assembly language output from the RBASIC compiler, after it's compiled the BASIC source file. You can modify this code, which you'll then compile to machine language to put on an option ROM.

Also note the label L1. This marks the beginning of code for BASIC line 1. Generating code for a GOTO 1 statement would simply compile to a Jmpl1 assembly language instruction.

FILE SIZES AND STATISTICS

See Table 1 for statistics. The two important numbers to look at are the BASIC file size and the ROM size. The ROM number shows how much memory the program occupies if compiled for an option ROM. Remember you have only 32K of code space to work with. Notice that the EM8SIG program doubles in size, thus pushing the 32K limit of option ROM programs.

The other numbers are for information only. The Assembly number is the size of the assembly language program. The Hex(RAM) number is the size of the Intel HEX file if compiled for RAM. The Hex(ROM) is the hex file compiled for the option ROM. The compile times given are for RBASIC running on a 10 MHz, 80286 AT clone.

One final note: the EM8SIG program did not run. I did not investigate what the problem was. In any event the program would have to be re-coded to remove some EDIT statements.

NEW FEATURES

KCSI has rapidly improved RBASIC since I reviewed it. As of this writing the current version is 3.31 (I reviewed ver.

1.60). A version of RBASIC for the Tandy 200 should be available shortly.

A special use of the MERGE verb allows you to embed assembly-language source code in the BASIC program. An enterprising programmer can modify the assembly-language output to create customizations not possible with BASIC. For instance, you might optimize a time-critical portion of your code. For example:

```
10 GOSUB 5000
20 'etc. etc.
5000 MERGE HOOPLA.ASM
```

This causes the contents of HOOPLA.ASM to be CALLED as line 5000. HOOPLA has just to meet the syntax criteria of the A100 assembler.

Version 3.31 of RBASIC supports clearing HIMEM in the compiled program instead of having to clear HIMEM separately, and also corrects an earlier oversight of not supporting the SCREEN verb. The CALL verb now makes use of an undocumented Model 100 feature:

```
CALL 50555,3,4'xyz
```

causes (as expected) the A register to be

loaded with 3 and the HL register to be loaded with 4. However, it also causes the DE register to be loaded with a pointer to xyz as a comment (the undocumented feature). Several commercial ROM's, such as the Polar ROM2, use this technique. The RBASIC compiler originally discarded all comments, causing efforts to pass this data into a machine language program to be lost.

CONCLUSIONS

RBASIC is a breakthrough product for the Model 100 family. All the secrets of option ROM programming are embedded into it. Now you can put almost any BASIC program into an option ROM. With RBASIC we may well see a surge of new applications that take the Model 100 family to new heights of functionality.

Even though you have to program an EPROM and adapt it to the option ROM socket, at least a major hurdle has been demolished in the path to rolling-your-own option ROM programs. The current price is \$299.95. RBASIC can be obtained from: King Computer Services, Inc., 1016 North New Hampshire Ave., Los Angeles, CA 90029 (213)661-2063. Mo Budlong can also be reached via CompuServe. His CIS ID is 76617,3310.

Manufacturer's Specifications:

RBASIC Compiler—\$299.95
King Computer Services, Inc.
1016 North New Hampshire Ave.
Los Angeles, CA 90029
(213)661-2063

The Switch That Tandy Forgot

Use this minor modification on your 1400LT to save your battery.

by N. F. Ireland

Even though I do not have an internal hard disk unit for my 1400LT, I read Jim Berg's article—"Five Months with Twenty Megs" (March '89)—with great interest. Not that I wouldn't like a hard drive, you understand, but I decided before I bought my 1400 that I would wait for an external unit to come along; I opted instead for the internal modem.

My interest centered around Mr. Berg's internal modification, which placed a diode in series with the positive battery lead, thus preventing the charging of the battery when using an external 12-volt power supply. I thought that this could benefit even those who don't have hard disks. Overcharging can cause serious battery damage and drastically shorten its life. At eighty bucks a throw per battery pack, this is no small thing. Eighty bucks will buy a lot of software.

In their *Practical Guide to the 1400LT*, Tandy suggests discharging the battery by running the computer until the LOW BATT warning light comes on (about four hours) and then recharging for fifteen hours. This continual charging and discharging can shorten the battery's useful life also. As you may know, you can cycle this type of battery through a charge-discharge from 200 to 300 times. This probably accounts for Tandy's estimate of a three-year battery life.

I suspect that many 1400LT owners like me use this machine most of the time as a desktop computer connected to an RGB monitor, printer, phone lines, etc. Except for power failure backup (a big plus!), the internal battery is pretty much superfluous, even a nuisance.

BERG'S MODIFICATION

This is where Mr. Berg's series diode modification comes in. Once fully charged, and with no load placed on it, the battery should retain enough power, for two or three months or more, to operate the computer for at least one half hour—more than enough time for a controlled power failure shutdown. Since the shelf life of this type of battery is in excess of seven years and, with this use, it is being charged only four or five times a year, it should last far longer than the estimated three years.

However, Mr. Berg's alteration uses an extra jack and could make charging the battery a bother. If you don't need the extra power required of a hard disk, you don't need to add the extra jack. Instead, to facilitate charging the battery and to return the computer to its original configuration for portable use, you can place a miniature slide switch across the diode. Mount this switch on the computer back panel above the external keyboard jack.

You don't have to disassemble the 1400LT completely to make the modification. Merely remove the battery compartment cover and battery as described in the instructions. Note in the back of the battery compartment the two wires, one black and



Photo 1. Place a switch on your 1400LT and double your battery's life.

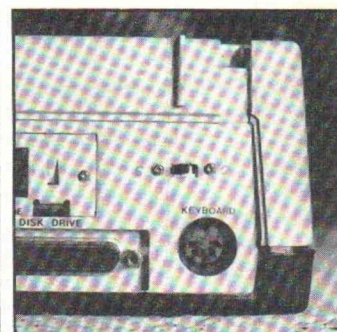


Photo 2. With the switch in the rear, S is for Standby and C is for Charge.

one brown (in my machine), which go to the chassis-mounted battery connector. Take the brown wire out of the cable clamp on the back wall. Cut this brown wire about in the center of the loop formed by gently pulling out the slack. Extend both ends of this cut brown wire by soldering about 2 inches of hookup wire to each of them. Insulate the junction with shrink sleeving.

Solder wire from the battery plug to the switch contact; solder the other wire to the switch arm. Solder the diode anode to the switch contact; solder the diode cathode to the switch arm. Mount the switch on the back panel above the external keyboard jack and the modification is finished. Replace the battery per instructions.

CAUTION: Always remember to turn the computer off using the power switch on the lower right side of the computer. Unplugging the external power adapter from the AC source without first turning the computer power switch to OFF simulates a power failure and the battery will power the computer. Without turning the computer off, especially if you use an external monitor, you can unwittingly discharge the battery completely (you'd have no way of knowing that the computer is still running), leaving yourself without battery backup.

Note 1: To prolong battery life further, the battery should be deep cycled (drained almost completely and completely recharged) once or twice a year using *Battery Watch* (Traveling Software) or some such utility.

Note 2: Silicon diodes of this type have a forward voltage drop of 0.6 to 1.0 volts. This may cause the LOW BATT light to illuminate in an AC power failure. Flipping your new switch to put the computer in its original configuration will usually extinguish the light (if the battery isn't actually low, of course).

Note 3: If you lack the skill or confidence to accomplish this modification, I'm sure a skilled computer technician can be found who will do it and be very pleased with a few extra bucks.

More Public Domain Programs

I received a call from Phil Wheeler recently. Those who are aware of the controversy stirred up over my "BASIC Bits" column in *Portable 100* (January '89) will remember that Phil requested I not distribute his programs via my column. The program in question was *XMDPW5.BA*, a very good Xmodem file-transfer program for the Model 100 originally written by John Chenoweth and extensively modified by Phil.

Phil has since given me permission to distribute that program and others he has written or modified, with a few exceptions. He has acquired the copyright from John Chenoweth, the original author of *XMD100* from which *XMDPW5* was derived, and he now requests that I distribute it rather than *XMD100*, which he says has a serious bug in it. The bug is that it pads the file with extraneous data remaining after the last sector has been entered and could ruin code that would be sensitive, such as your password from a comm program, if it was at the end of the sector of a file from an MS-DOS disk.

Anyway, I think it was a fine gesture from Phil. He commented that at first he thought I was taking advantage of authors while not contributing my own original works to the Model 100 community (part of the reason for his original reaction). He has since learned of some of the programs I have written and understands better my motives in distributing the programs.

I am including Phil's *XMDPW5* Xmodem program and documentation on this disk and am also putting it back on my distribution disk for the November column if anyone would like to get this program.

Throughout this public discussion, I have received several letters, mostly supportive of my method of distribution. While I have had little space to print the letters in my column, I wish to extend my thanks to all of you who wrote.

Russ Hall of Salt Lake City, Utah, author of *MEMORY.BA* ("Feeling Senile?" Feb. '89), sent not only the following note but a disk full of programs he has written. He writes: "I appreciate your efforts to share Model 100 public software. I agree

with what was said in your March *Portable 100* column about this machine needing all the support it can get, since its time in the limelight is already past! But it looks likely that our hope of these PORTABLE portables continuing to be used for quite some time will be a reality.

"I'd like to share with you some programs I've written on the Model 100. If someone else can make use of them, more power to them!"

Charles Wilbur of New Windsor, Maryland, also sent a program he wrote, and both Charles' and Russ' programs are described below.

"I'd like to share with you some programs I've written on the Model 100."

CABLE.BA

CABLE.BA, by Charles H. Wilber, helps in the identification of cables and their characteristics. You can search the data supplied in the program by either cable type, dielectric strength (volts RMS), or impedance (ohms) and determine which cables meet those characteristics. For example, if you need a cable with a minimum dielectric strength of 5,000 volts rms, you enter that information and receive the following as one of the selections of cable to use:

cable	min.die.str.	imp.(ohms)
58a/u	5000	50+/-2

Russ Hall has sent many very fine programs for use in this column, too many to describe here. A few of them require *Ultrascreen*, *TS-DOS* and/or *TS-Random*. I'll save them for a later column, though not having *Ultrascreen*, I may not explain them adequately or try them out.

APBOOK.BA

APBOOK.BA, by Russ Hall, is a pocket

appointment book printer. It prints a blank "senior" or "junior" sized appointment book on computer paper. While the program was written for use with an Epson-compatible printer, the documentation gives instructions to modify the program to your own printer's commands.

AROBIK.BA

AROBIK.BA, by Russ Hall, provides a jogging record/aerobic point calculating program. This program works with times and distances to calculate the body's expenditure from walking-jogging-running according to calculations worked out by Dr. Kenneth Cooper, who coined the phrase "aerobic." If men earn 35+ points per week and women 30 points, according to Dr. Cooper, you have a significant insurance against heart/lung disease.

Earning 60+ pts/week for men means you are in better shape than 3/4 of the population. *RATES*, a companion program also by Russ, prints out an age adjusted heart rate chart on your printer.

POSTER.BA

To print out poster sized letters on any printer (7 lines by 5 spaces), the program called *POSTER.BA*, also by Russ, will let you do this. This ingenious program uses the Model 100 ROM to determine the pixel mapping for the characters. It then uses the ASCII character 143 as the printing character for the poster sized letters. Instructions are given to change that character to anything else of your choosing. Depending on your printer, you may have to do this. A maximum of 23 characters can be printed by the poster.

SHORTN.BA AND IBM.BA

Russ also provided two utilities for BASIC programmers called *SHORTN.BA* and *IBM.BA*. *SHORTN* condenses your GW-BASIC listings and also your Model 100 listings. You can run most IBM BASIC programs on the Model 100 without change except as noted below. *SHORTN* makes them shorter by removing the spaces needed by the IBM but not needed by the Model 100. It also combines BASIC

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statement lines when possible. One problem I noted is in handling REM statements pointed to by GOTO type statements.

The other program, IBM.BA, adds spaces for use with GW-BASIC on the IBM computer. Again, with REM statements I noted an insignificant problem. The program analyzes the remark as if it were a statement and will put spaces between supposed keywords. Differences between the Model 100 BASIC and IBM's GW-BASIC are minimal. The most notable changes you have to make are exchanging PRINT@ statements with LOCATE statements so they become IBM compatible. Also, statements for SOUND are also slightly different in frequency and duration. Probably a few other changes are needed also.

DICT.BA

One of the more interesting programs from Russ Hall is a spelling checker written in BASIC called DICT.BA. You can build your personal word files with this program to check your spelling. You begin forming your dictionary with some of your past text. You verify the spelling of words as DICT.BA comes across them for the first time.

The program works with two word files, one with words of two to five letters in length, and one with six to fifteen letter words. You create the word files for the first time starting the shorter word file with aa,, and the longer with aaaaaa,,. The two commas are important at the start of these files or you'll get errors that stop your program. These heading characters act as switches for the program telling it which set of words to check, the shorter or the longer words. They tell the program that you are using the shorter word, a word list, or the longer one. Remember to

save them permanently under different names, then load just one at a time into RAM calling each WORDS.DO because both lists must have that name to work with the dictionary. Also make sure all the words you add are spelled correctly.

A DOS like TS-DOS, Power-DOS, or Disk Power would be helpful when using this program. This program is very memory intensive (it needs 13,000 bytes for string space). By turning DOS "ON" with any of these programs, you can spell check your text file from the disk.

LIBCR2.BA

A library card printer by Russ called LIBCR2.BA uses official library card parameters to print out reference cards. I assume there are proper sized cards available with pinfeeds to do this. When using this program, you enter commas as field delimiters when an answer calls for more than one parameter. For example, when it asks for date and you wanted to enter the date for July 30, 1989, you would have to enter July,30,1989. You can use any printer. The program prints out the usual number of cards needed, or else you can select to print out only single cards.

BALL.CO

I usually steer clear of games in this column (maybe I shouldn't, though), but BALL.CO caught my interest, a fast-playing machine-language ping pong game written by Russ. Interestingly, your paddle moves very slowly, so you must quickly estimate where the ball will pass the plane of the paddle after ricocheting off of the sides of your LCD screen. You must go to BASIC and type CLEAR 0,60000 (and press ENTER) to protect high memory before running this program. I provide this program as a BASIC program that creates BALL.CO.

RPCALC.BA

Russ has also written a recipe calculator called RPCALC.BA. This program recalculates your kitchen recipes to greater or smaller size depending on how many guests you are inviting to dinner. You create a file with the ingredients and their amounts. Then enter the number of servings it is supposed to make and the number you wish to make.

THANKS!

I thank you, Russ and Charles, for sharing your programs with the readers. I encourage all of you to share your programs by sending me a disk with your favorite public domain and shareware programs for the Model 100/200. If you send a dollar for return postage, I'll return the disk with a selection of programs of my choosing. Please do not send cassette tapes, and avoid sending a 200K disk. It is difficult for me to find someone who can read them for me. If you do, please mark it as such. I can also accept 100K disks, TRSDOS disks, or 3.5-inch (720K) and 5.25-inch (360K) MS-DOS disks.

As a convenience to readers, this month's programs, including XMDPW5, is available to readers on a 100K TPPD1 disk for \$7. To order the selection of programs described in this column or any other "BASIC Bits" column, send \$7 along with the month and year of the column to 6237 Windward Drive, Burke, VA 22015. This includes packaging and handling. The cost per disk is not to pay for the programs but for the cost of distribution. If you would rather have the programs in ASCII format for Radio Shack Model 3 TRSDOS or MS-DOS, please specify them. The cost is the same. A self-addressed label will speed your order.

by Thomas L. Quindry

Get the Most from TEXT

(Second of 3 Parts)

Last month's column reviewed the design and functions of the TEXT program built into the Models 100, 102, and 200. We discussed the value of thinking through your uses of TEXT to develop standard formats for each of those uses. Finally, I encouraged you to think of yourself, your computer, and your printer as a system. Exploiting the best features of each part of that system greatly increases the results you can get from it.

I presented several simple techniques for producing letters, memos, and labels on the Tandy laptops and your favorite printer. This month, I will expand these same techniques and apply them to producing reports. The approach is still plain vanilla (no BASIC).

A report is a document that relates facts, ideas, and recommendations. The organization and format of such a document is designed to help another human brain make sense of, assimilate, and evaluate those facts, ideas, and recommendations. This means that you set up margins, headers, and line lengths to guide your reader's eye and facilitate reading. The organization of the document should guide your reader's mind down a path to a certain conclusion, and should also guide the reader to agree with it. Avoid distracting the reader from your objective.

REPORTS VS. LETTERS

Mechanically, report formats are much like those of letters. You provide margins on all four sides, indentation, and sideheads; these have a big effect on the way the eye scans the lines of print. If your report is more than two pages, you also need other aids, such as page numbers, headers, and footers. As with letters, you'll center some information and you may include tables. You'll probably not backspace any information from the right margin.

Reports differ from letters in complexity. You have to help readers organize a lot of information. You also have to keep them from losing sight of a report's purpose. Long reports usually have a cover

page, a table of contents, an executive summary, a statement of the author's recommendations, a body that presents and discusses ideas, facts, and other matters supporting the recommendation, and a summary or conclusion that repeats the recommendation. Extensive evidence to support matters in the report is best placed in appendices, where the reader can peruse as much or as little as necessary at leisure. All these features, properly executed, help people get hold of information, see trends, and come to a decision about your conclusions and recommendations.

The art of good business writing consists of doing everything you can to help others understand and agree with you. This means being clear about your purpose from the start. Before you begin to write, think about the outcome or result you want. What action do you want the reader to take? What decision do you want the reader to make? Then identify

The organization of the document should guide your reader's mind.

the ideas or values that others must accept so they may arrive at that action or decision. What examples, facts, or illustrations can you use to motivate and support such an acceptance? Finally, what's in it for them? You have to sell benefits, beginning with the report title.

The easiest, most elegant way to write a report is to do it backwards. This means writing the conclusion first, then the body of the report, and finally the recommendations and the executive summary. Write the title of the report after the rest is completed, and word the title so that it echoes your recommendation. Finally,

organize whatever material may be required in the appendices and prepare the table of contents and index.

While this approach may conflict with everything your high school and college teachers told you, it works. It produces clear, well-organized reports because it keeps your mind on the outcome at all times during the process. As you write the body of the report, you'll find it easier to eliminate irrelevant matters and to keep to the heart of what you want to say. The person who receives the report will appreciate not wading through the whole thing to get to the point. Surprise endings are for fiction. With a surprise opening, you are more likely to keep the attention of the bosses. They are more interested in learning how you came to your conclusion than in following a tortured trail of logic to an unknown (and perhaps dead) end. Just remember three things:

- Keep it simple
- Be sure everything you write supports your conclusion
- Keep it simple

USING TEXT FOR REPORTS

OK, so how will you do this with your trusty Tandy 100/102/200? Simple. Just as you did the letter last issue. Let's quickly review the relevant techniques.

First, remember that you should begin by sketching out the physical layout of your report. Decide how wide you want your side, top, and bottom margins. The same 65-character line (in 10-pitch) you used for letters also looks very good in a report. Remember, though, that if you are going to bind your report, you should use a left margin of 15 or 16 spaces to allow for this. If your printer interprets the TAB character as 8 spaces, you can set left margins by hitting TAB twice at the start of each line as you format manually. (Of course, you don't have to bother with this if your printer is capable of setting the left margin on its own.) Decide whether you'll use a header, a footer, both, or neither. This affects the number of text lines on your page. Headers often appear about a half-inch from the top of the page and footers about an inch above the bot-

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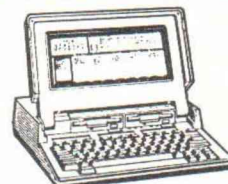
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tom, but these are matters of individual taste. Just be sure to design so the text block looks balanced between margins, header, and footer.

Second, recall that the general rule is to type your text and debug it completely before you format it. Further, format it before you go sticking in printer control codes, especially for underscoring. If your page design requires underscoring—say, sideheads—be careful always to end the underscoring at the right margin, and start it again on the left side.

Third, you'll save yourself much labor if you get your printer to handle the margins, line lengths, justification, and so on. I feel so strongly about this that I would recommend that you sell or scrap your present printer if it can't at least set side, top, and bottom margins, and get yourself a new machine. If the printer centers and right-justifies in response to control codes, so much the better. The days when all printers were alike (i.e., mediocre, feature-poor) are long gone. Go do some shopping. Tell 'em I sent you.

If you are stuck with a less capable printer, you'll recall the simple techniques presented last month for centering, setting line lengths, and managing tabular entries manually. These are just as useful for reports as for letters.

Note also the general strategy from last month: outlining. You'll set up one .DO file for each section of your report (conclusion, body, recommendations, summary). Each of these sections will have an outline of its own, which you'll expand just as you did with the letter.

You also need to prepare one other outline to guide all the others. This one starts with a statement of the primary recommendation you are making and is filled out with brief descriptions of the supporting ideas and values. Follow each

of these supports also by brief statements of the facts, examples, and illustrations you have collected in your investigations. Since displaying this outline is likely to take more than eight lines, I like to print it out and keep it handy for reference. Then I go about setting up the other files and outlining them, beginning, as stated earlier, with the conclusion.

In a very long report, it is useful to format and print each section as you completed it. As you'll see, this is a "draft" run, but it helps you keep your thoughts organized. In a long report, you

The days when all printers were alike are long gone.

have to save sections to mass storage to make room in the machine for succeeding parts. When in storage, of course, you can't review the sections to see how (or if) you addressed a particular point. In a report short enough to fit into RAM, you need only cut and paste sections to each other when all are completed. The short report is more easily printed with sections run together. In the long report, you'll probably print each section separately for the final copy.

HEADERS AND FOOTERS

The only tricky parts about producing a report with TEXT alone are headers, footers, and page numbers. I know of no printer that handles these chores (yet). The lazy approach is time-consuming and wastes paper. The frugal approach, also time-consuming, saves paper.

The lazy approach consists of printing the file(s) after formatting the side margins, to see where the page breaks fall. Cut and past the header (located in another file) into the file to be printed just before the first line on the second page (first pages almost never have headers). Insert carriage returns before the header to establish the correct bottom margin on the first page, and the correct top margin on the second. Insert more carriage returns after the header to get the right number of lines between header and first line on the second page. Print the file again, and repeat the above process to put the correct lower margin on the second page and the header on the third page with the right top margin and space down to the first line of the third page. Print the file again, etc., until the job is done. A similar approach works for footers.

In the frugal approach, count lines by hand, without printing the file, and insert headers and footers on the correct lines. Insert carriage returns to establish page breaks. Ack. I prefer to use a little extra paper, but suit yourself, or wait until next month when I roll out the text formatter.

Well, that's it for this month. Next time I'll wrap up this discussion of TEXT by giving you some BASIC lines to take the tedium out of reports. There may be a couple of freebies, too—we'll just have to see.

Valeas, qui legis quod scripsi!

by Bill Brandon

Bill is now the manager of Employee Development for Atmos Energy Corporation, a natural gas utility holding company in Dallas. You can reach him on CompuServe [71316,5161], through Portable 100, or at 534 Villa Corona, Mesquite, TX 75150.

DEFUSR appears monthly to answer your questions about Tandy notebook computers.

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GREAT ESCAPES

In his May 1988 column, Bill Brandon listed two programs, *UPDATE.BA* and *FETCH!.BA* that made use of "escape codes." I am familiar with the use of escape codes to control printer functions, but this is the first time that I have seen them used in programming the computer itself. I checked in my Model 100 manual and in David A. Lien's book, "The TRS-80 Model 100 Portable Computer," but could find no reference to them. Does anyone know where an explanation of the use of escape codes and a listing of such codes can be found?

William McWeeny
Portable BBS

Escape codes can be used to control certain

A	Move cursor up
B	Move cursor down
C	Move cursor right
D	Move cursor left
E	Clear display and home cursor
H	Home cursor (no clear)
J	Clear from cursor to end of display
K	Clear from cursor to end of line
L	Insert blank line at current line; move text down
M	Delete current line; move text up
Q	Turn off flashing cursor
T	Protect label line from scroll and overprint
U	Unprotect label line
V	Inhibit scrolling
W	Enable scrolling
YXZ	Move cursor to row X, column Z (ASCII character values minus 32)
j	Clear display and home cursor
l	Clear entire current line
p	Enable reverse video
q	Disable reverse video

Figure 1. Undocumented escape codes perform screen and cursor control functions. Example: PRINT CHR\$(27) "p"; to enable reverse video.

screen and cursor functions. Although undocumented in the owner's manual, a list of them was published in 80 Micro (January '84, p. 174), and probably elsewhere.

Figure 1 shows the escape codes. Use them via BASIC's PRINT statement, followed by CHR\$(27), which is the ASCII code for ESC, and then the desired code.

For example, to clear the screen from the cursor position to the end of the display, use the statement PRINT CHR\$(27) "J"; (within a BASIC program line or typed directly from BASIC's Ok prompt). The statement PRINT CHR\$(27) "p"; turns reverse video on, and PRINT CHR\$(27) "q"; turns it off again.

Note the semicolons following these state-

This call is not documented in the manual.

ments. As with normal PRINT statements, they prevent the cursor from advancing after the statement is executed. Leaving them out would cause the cursor to move to the beginning of the next line after executing the command.

Also note that case is significant—J and j give different results. (Two codes, E and j, seem to produce the same result. I don't know the reason for this redundancy.)

-MN

LUCID TO D/VI

I have a Disk/Video Interface (D/VI). I use it primarily to store document files and document backups for work in process. It is fast and efficient (and paid for).

I also have Super ROM and am a "power" Lucid user. But on several maddening occasions I have lost entire spreadsheets in the Copy/Paste mode. It dawned on me that I don't backup spreadsheets as I should, because the cassette filing method is so slow. In fact, while saving a spreadsheet of 7K, I wrote this note.

I am not able to purchase a portable disk drive, nor do I wish to further complicate my system. What I want is a short program that could be used as a utility to save and retrieve complete Lucid files on the D/VI.

It is the peculiar file extensions (.CA) that cause the difficulty. While it may not be able to be done through Lucid, it should be possible from the menu. Please help me out!

Greg Tilot
Saginaw, MI

I think what you need is already available. Among other handy functions, the program CHANGE.BA can convert Lucid's .CA files to normal .CO form and vice versa, so they can be saved to disk, D/VI, and other devices requiring the .CO extension and format. Just convert .CA files to .CO before storing them on the D/VI, and back to .CA after retrieving them.

Columnist Paul Globman says you may need to disengage Super ROM before using the D/VI. To do so, enter BASIC, type CALL 27801,,256 (note two commas) and press ENTER. Incidentally, this call is not documented in the T200 Super ROM manual, so write it down somewhere! (The M100/102 call is correctly documented in the M100/102 Super ROM manual.)

CHANGE.BA is available on our Portable BBS in the Model 100/102 version. CompuServe's Model 100 Forum has both 100/102 and 200 versions available. Be sure you get the correct one for your machine.

-MN

XOS-C

E

ditor's note: While Paul Globman is off developing some new Tandy 200 marvel, we told Carmen Paone we'd publish his baby pictures if he didn't fill in. He consented. (If you saw those photos, you'd understand why!) Herewith, then, his impressions of Paul's XOS-C package for the Tandy 200:

What is XOS-C, and what is a three-bank Tandy 200 without XOS-C installed in it? XOS-C is Paul Globman's "Cross-bank Operating System," and without it your Tandy 200 is incomplete, VERY incomplete.

Without XOS-C your Tandy 200 cannot call .BA or .CO programs from whatever bank they are located in and use them in whatever bank you are operating in. You would have to jump to the bank where the program is located, instead of making the program jump to the bank where you would like it to run.

Without XOS-C you would not be able to move the paste buffer from bank to bank as needed (cut from one bank and paste into another bank). Without XOS-C you would not be able to execute your option ROM with a function key from the menu (a utility program is provided to customize the label above the ROM function key).

Without XOS-C your Tandy 200 would sit idle while printing your TEXT files, but XOS-C allows background printing while working on another .DO file or running a program. XOS-C also permits you to rename .DO, .BA, or .CO files, list the files in the two other banks, and go backwards from one bank to another.

The secret of reverse bank switching was the first feature that Paul presented to Tandy 200 users in this column, and most of the cross-bank features that Paul has presented here are incorporated into XOS-C. By using an advanced loader and data file combination, it loads all three banks in a matter of seconds, and it occupies only 768 bytes in each bank, so an empty bank (with XOS-C installed) offers 18,822 bytes instead of the usual 19,590 bytes.

For me, the real advantage of XOS-C is the CMD> function. With this feature, a user can call in any .CO or .BA program from any bank and execute that program in whatever bank is currently active, accomplished via X-BAS2, which "calls in" and executes BASIC and machine language programs in other banks. You can kill text files in other banks too. In conjunction with XBASIC (also by Paul), full cross-bank programming capabilities are provided.

The F3 (Cmd) function of XOS-C can put .CO programs, which can sit idly in bank 3, to work. I have found the real advantage of XOS-C with CMD> in the case of my Xmodem program, a program of over 4000 bytes. When I run this program in bank 1, it doesn't occupy the RAM as a file, just the space it needs to run.

Normally, pressing F3 (Cmd) prompts you for the name of a file to run, but if you keep the CAPS key locked down, the F3 key doesn't ask for a file name to execute. It automatically executes a file (located in bank 3) called CMD>. With the cursor over BASIC, pressing F3 executes CMD>.BA. With the cursor over any

other file name, F3 executes CMD>.CO. This makes F3 (Cmd) appear dedicated to user-defined functions.

When the cursor is over a .DO file, you can execute a program such as CKSM.CO (a checksum program) with the F3 key, and it operates on the cursored text file. If CAPS is locked down and CKSM has been renamed to CMD>.CO, then you can use F3 to display the checksum of the selected text file with just one keypress.

One note about TELCOM ... XOS installs XTLCM3 and allows on-line bank switching. This is great for uploading as well as downloading, when you must transfer several files that can't all fit into one RAM bank. Direct access to TEXT, and the display of Files and Bytes Free (while on-line) are also part of what XOS provides.

XOS-C is an invaluable tool. Your Tandy 200 should never be without it! XOS-C is available free to CompuServe users in the Model 100 Forum, or can be ordered directly from Paul Globman, 9406 NW 48th St., Sunrise, FL 33351, for \$14.95.

Carmen Paone owns two Tandy 200 computers and writes about agriculture for the Reading (PA) Eagle-Times.

by Carmen Paone

Continued from pg 5.

important papers comfortably, knowing that they'll come out of the bag looking as they did when they went in. For all the miscellaneous items, figure \$40.

All in all, the portable office allows me to function independent of my physical location. It provides me with the basic tools of my trade, always close at hand. Whatever you use your Tandy for, there's probably some benefit that you can derive from adapting the concept of the portable office to your own needs. Even just having all your Tandy-related items in one place can help—no more laments like "I know I should have saved the file, but I couldn't remember where I left my disk drive."

So what's the bottom line? Well, my version of the portable office, as it sits, cost me just under \$1,500. I'll admit that's a lot of money. But when you stop and think about it, it costs no more than the average MS-DOS laptop by itself would cost—but look at how much more a complete setup like this is capable of doing.

And that's the real bottom line: capability. It's the sum of an equation that seems to elude the typical IBM power user. It's not how powerful your machine is—it's how powerful you become by using it. Something to think about.

Oh, by the way: you'll be pleased to hear that I mustered the will power to finish all my work for my clients that day—after a brisk ride on some winding mountain roads. True to the spirit of the portable office, I did it over a long lunch served by beautiful waitresses at an outdoor table at La Casa Burrito. Hey, somebody's got to do it, right?

by Michael Daigle



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LAST CHANCE FOR PICO BACK ISSUES!

Our announcement in April garnered such a great response that we've extended the deadline! If you want any *PICO Magazine* back issues, many with articles and columns directed at the Tandy 100/102, 200, NEC-8201, Olivetti M10, and Kyocera KC-85 computers, order now. Once the demand for them drops down, any unsold issues un-

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If you want any of these, just photocopy this page, circle the ones you want, add them up, and mail your

check with the photocopy to: Portable Computing Int'l Corp, PICO Back Issues, P.O. Box 428, Peterborough, NH 03458. For faster service call 603-924-9455 and have your Visa, Mastercard, or Amex cards handy. Order TODAY, they might be GONE tomorrow! *Note: The italicized entries in each month below are Tandy 100/102 related articles.*

1985

January: DG has the One to Go, *Model 100 Proves Itself in the Jungles of Nicaragua*, Meet the Dulmont Magnum, *Telecommuter: Software that's Ingenious*, Kyocera's Three Aces. End Telephone Tag with M100's.

February: NEC Wishing upon Its Starlet, In-Depth Reviews of HP 110, Sharp PC-5000, *Chattanooga Systems AutoPen, AutoPad, Trip*.

March: Reviews of Epson Geneva and Osborne 3, Comparisons of Two Thermal Printers (Brother HR-5 and Printex TH-160); *The Pluses and Minuses of Batteries*, *M100 Data Acquisition*.

April: Reviews of Sord IS-11, Sharp PC-1350, *DISK+*, *T-BASE*, and Roadrunner; *Free Software: Textpro*, Technology Transfer Damming the PICO Pipeline to Russia.

May: Review of DG1, Which Spreadsheet Should you Buy? Servicing Picos, LCD Screens in Color, Federal Express.

June: Reviews of Tandy 200, 2.2 Companion, and T-Backup, *M100 File Transfer*; Wrangler improves the Odds with Sharp PC-5000s, Dow Jones News/Retrieval On-line Database, *Courtroom M100's*.

August: Reviews of Datavue 25 and *Touchbase Modem*; QuickTrip Convenience Stores More Efficient, Tracing Tribal Roots and Translating the Bible in Jungles of Papua New Guinea.

September: Reviews of HP Portable Plus, *WriteROM*, *ThinWrite 80 Portable Printer*, A Flat Mac, *M100 Meets Challenges at Woods Hole Oceanographic Institute*.

October: Reviews of Kaypro 2000, *T-View 80*; Computerized Fire Department, Stretching the limits of Telephone and Computer, *BASIC translation Tactics*.

November: Reviews of Bondwell 2, NEC 8027A Printer, CQ Haste; *PICO Formatter*, Search and Rescue Via Computers, Industry Views from an HP Exec.

December: Close Look at Ericsson Portable and *TMPC (time management software)*, Travel Tips, Tricks for Traveling, *Dialer Program*, *Project management with the M100*.

1986

January: Reviews of Gridcase 2, Access, Word-Finder, and Prospecting, CP/M and MS-DOS, *Security Program*, Can Universities Cope with Picos? News from Comdex, *Jazz up your LCD*.

February: Reviews of ZP-150, and LeScript Word Processing; *Stevie Wonder Inspires Stardom in M100*, Can Universities Meet Expectations of Computer-literate Students? *Cold-Start recovery*,

Personalized Form Letters.

March: Reviews of Panasonic Exec.Partner, Lync 5.0, and *Hardwire*; University Rethinks its Tasks, Picos in Medicine, *Auxiliary Battery Packs Spell Independence*, *More Muscle for the M100*.

May: Reviews of Toshiba T1100, IBM PC Convertible, Casion FX-7000G Calculator, SG-10 Printer; *MIKEY*, *Appointment Manager*, and *FAST*, IRS Crowns Zenith's Z-171, Handhelds in Restaurants.

June: Reviews of Zenith Z-171, *LapCoder*, *SuperROM*, *LAPDOS*, and *BlackJack*; Go Shopping at PC in Rochester, NY, OM10 RAM Map (pt 1), A Tale of Two City Councils.

July: Reviews of Bondwell, ROM2, Letterjet HS-80, and Sidestar; Electronic Cottage, Taking Stock of Investment databases II, NEC 8201A's LCD, OM10 RAM Map (pt 2)..

August: NH's Governor discusses Laptops, PC-7000 from Sharp, Choosing your test-oriented Database manager, *Model 100/200's Lend a hand to Job Seekers*, NEC-8201A's Communication Connection.

October: Reviews of Toshiba 1100+, New Word, *Diconix Printers*, Fortune 500 Picos, Interview with DG Exec's, Desktop publishing with Picos.

November: Picos in Libraries, *Clever M100 Combinations*, *Exploring TPDD Part I*, Reviews of Data-computer 2.0, *TPDD*, *TS-DOS*.

December: Picos on Wall Street, Connecting to On-line Databases, Telephone Problems, *TPDD Part II*, Reviews of *Cleuseau*, *French/German Tutor 3*, *Pocketsize Modems*; 1986 Article Index.

1987

January: Book Publishing With a Pico, *Framework in a Pico*, Review of Right-Writer, JK Lasser's Money Manager, HP+Enhanced, Electric Webster, *Disk Power*, Pico's Computer Buyer Guide.

February: *Poor Man's Idea Processor*, Macintosh-Pico Connection, *M100 Cursor key alteration*, Handhelds: HP-18C, Langenscheidt 8000, TI-74, Reviews of Sord IS11-C, *Lets Play Monopoly*, *\$100 letter quality printer*.

April: Browsing the Boards, Writers & Portables, KTI products, Badminton & NEC, Reviews of *Inside the M100*, *TTXPress Printer*, *PCSG Business Analyst*, *Datapad 84 Zoomracks* & ECFS.

May: Doctors with Portables, *Text to printer*, Hitting the Board **OUT** of PC Convertible Add-ons, Holiday Best, *Twist & Shout*, *M100 memory Expansion*.

June: Lawyers & Laptops, *Personal Management System*, *M100/Mainframe Terminal Prog.*, Re-

views of Wang Portable, *Search*, *Sprint* and *Super-calculator*, *Best of Compuserve book*, Chess-to-go.

July: Programming in the Portable Environment, Sysop interview, Talking portables (pt1), Portable Computer Buyer Guide, Reviews of *TS-Random*, Software Carousel, Popcorn & the Hyperion.

August: NEC 8201A's Laptops in Movie filming, Talking Port **OUT** Reviews of Casio FX-8000G, Tandy 1400LT, and *System 100*.

September: *English Teachers use Laptops*, *Picos in Class*, Document templates, *Picos in the Oil Patch*, Reviews of HP ColorPro, and the *Sportster 1200 modem*.

November: *Control That Printer*, *Academia & Laptops*, Laptops on Capital Hill, Starlet Secrets, Reviews of Psion II, *DVORAK keyboard*, & Spark.

December: Global Laptops, Starlet Software, Toronto Blue Jays & GRiD, *NiCd Notes*, Review of IMC LCD-286, 1987 Article Index.

1988

January: Portable Computer Cellular Communication, Laptop Roundtable, Pico Portable Guide, Reviews Telemagic, Direc-Tree Plus, SchwabLine, Quotrek.

February: TenniStat, Flexibility of Form, T200 and T16. Reviews Eclipse, T1100 Hard Drive.

May: Handhelds Fight Crime, A Pico in China, Compaq Port. III, Datavue Snap, Fax hits the Road, HP Portable Vectra, T1400LT, Three Pocket Modems, Close-Up's Customer & Support.

June: Multispeed in the Tropics, *Monitoring Alkaline Batteries*, PSION and Mass Storage, Datavue Spark, Smith Corona Portable Word Processor.

July: Toshiba on the Road, *Diskette Ratings*, *Metered NiCd Manager*, Procomm on the NEC, WordPerfect 4.2 on the T1000, Sales Ally.

September: Laptops & the Learning Disabled, WordPerfect 5.0, Dynamac EL, HP-71B, WordPerfect Executive, Webster's New World Writer II.

October: Portables at Sea, Macintosh Navigating, Piloting and Celestial Progs, NEC-8300, Compaq Port. 386, File Transfer, Golden Parachute.

November: European EMAIL, New Tricks for your Cassette Recorder, Pico Pillows, Amstrad PPC-640, Selecting the President, Sales Power, Sales Strategy, Office Writer goes Light.

December: FASTECH, Automating Your Sales Force, AI, ScriptWriter, LiteDrive, Homeword Plus, VP-Expert.